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Alviso Slough Restoration Project

FINAL PROBLEM DEFINITION AND REFINED OBJECTIVES REPORT

January 9, 2007

Prepared For:

Santa Clara Valley Water District

By:

EDAW

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EXECUTIVE SUMMARY

ES-1. OVERVIEW

The purpose of this Problem Definition and Refined Objectives Report is to describe the existing conditions of the project area, re-evaluate the project objectives defined in the Project Plan based on the knowledge gained by investigation and documentation of existing conditions, and refine these objectives as appropriate. This report describes the history of Alviso Slough, summarizes key project issues, and defines project opportunities and constraints.

This report was prepared based on information from numerous published reports and articles, and from discussions with scientists with extensive knowledge of local conditions. Input was also provided by the Alviso Task Force (AWTF), with which the District formed a Collaborative, with the stated intent to "collectively work together toward flood protection, habitat enhancement and restoration, and recreation in the Alviso area." (SCVWD, 2004)

This report is the first step in the Planning Study for the Alviso Slough Restoration Project. The final products of the Planning Study will include (1) environmental review pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), (2) a regulatory permit strategy, and (3) an Engineer's Report.

One of the most important aspects of the planning process is the participation of interested parties within or near the Alviso Community and greater South San Francisco Bay Estuary, who have a particular interest in the goals, activities, implementation and outcomes of the project. Besides working with the AWTF, the District is committed to involve the general public, other community organizations, and regulatory agencies in the alternatives development process and in the environmental review process.

ES-2. PRELIMINARY FINDINGS

PROBLEM DEFINITION

Between 2002 and 2004 the District implemented one-percent (100-year) flood protection measures in the Guadalupe River from I-280 to I-880 in San Jose (Downtown Guadalupe River Flood Protection Project) and from I-880 to the County Marina in Alviso (Lower Guadalupe River Flood Protection Project). The project work included a combination of floodwalls, levees and channel improvements. Along Alviso Slough between the Gold Street Bridge and the County Marina, one-percent flood protection work consisted of raising existing levees and constructing an overflow weir at an existing low point in the levee to facilitate the diversion of high flows to the adjacent former salt pond complex (Ponds A8-A7-A5-A6). Vegetation removal was performed only in the uppermost section of this reach, near the Gold Street Bridge, to facilitate flows over the weir as part of this flood protection project. The project area continues to be subject to tidal flooding. Flood risk continues to be a major concern of the community.

The reach of Alviso Slough downstream of the Gold Street Bridge has experienced a gradual decline in channel width and increasing encroachment from vegetation over many years. These conditions have come about after over a century of human activities such as groundwater over-pumping, the manipulation of the South Bay marshlands and drainage channels for agricultural and salt-making purposes, the realignment of channel meanders for more efficient flow conveyance, and urban development in the watershed. These anthropogenic influences, combined with natural processes attempting to achieve a level of equilibrium, have resulted in a reduced channel width and depth that precludes the community's ability to use the slough, as it once did, for navigation and recreational access.

For many years, the community of Alviso has requested that the slough be restored to previous conditions where both the width and depth were greater than today's conditions. In November 2002, District staff presented, for the Board of Directors' consideration, enhancement opportunities for the Lower Guadalupe River flood protection work. One of these enhancements was to remove sediment and vegetation from Alviso Slough as a restoration project. After Board direction to further evaluate these enhancements, staff returned a series of recommendations to the Board of Directors in January 2004. At the January 20, 2004 Board meeting, many members of the community and the public presented their interests and strong support for slough restoration that would both remove vegetation and restore salinity levels to historic conditions. The speakers enumerated the benefits of such actions for the community, including improved navigation, boating, recreational access, and habitat improvements. The Board approved a motion directing staff "to prepare a project that includes the following: Phase I, removal of 7 acres of vegetation and root mass to a depth of 4 feet on both banks of the Alviso Slough from the Gold Street bridge to the County Marina; and then in the following year a long term project related to bringing in salt water."

Removing the vegetation and root mass in accordance with the Board motion, would create more open waters, enhance the natural aesthetics, and incidentally improve recreation access from the shores. It would allow the community of Alviso to return to historic use of the slough. Concurrent with this effort, the first phase of the South Bay Salt Pond Restoration Project, led by a consortium of agencies, (California Coastal Conservancy, U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers, CA Dept. of Fish & Game), is underway. One first phase action would include a muted tidal connection at Pond A8 adjacent to Alviso Slough. This project would increase the tidal prism through the slough, scour the channel to a greater width and depth, and would tend to increase salinity levels.

ASSUMPTIONS, OPPORTUNITIES AND CONSTRAINTS

The following assumptions are identified for the Alviso Slough Restoration project:

- Both CEQA (EIR) and NEPA (EA or EIS) documentation is required.
- A "no project" alternative would be strongly opposed by the Alviso Community as a short- or long-term solution.
- There are data (from existing reports and studies currently underway) available from the South Bay Salt Ponds (SBSP) Restoration Project, the Lower Guadalupe River Flood Protection Project, the South San Francisco Bay Shoreline Study (Shoreline Study), and the City of San Jose South Bay Marshes mapping project, some of which will be directly applicable to the Alviso project.

- Permits or other authorizations will be required from the San Francisco Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers (USACE), The San Francisco Bay Regional Water Quality Control Board (RWQCB), NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA), California Department of Fish and Game (CDFG), and the California State Lands Commission (CSLC).

For purposes of this report, an opportunity is defined as either 1) a specific benefit that can be directly achieved through implementation of the project; or 2) a potential enhancement or other planned or future project by other entities in the area that contributes to the overall community interests. The following potential opportunities are identified related to the project:

i. Restoration of marsh habitat to previous conditions (i.e., creating marsh and associated tidal, subtidal, and fluvial habitat suitable for multiple uses including navigation, recreation, fisheries, and wildlife).
ii. Enhance recreation opportunities at and surrounding the Alviso Slough:
  - Fishing and hunting
  - Wildlife viewing (bird watching, etc.)
  - Environmental education
  - Trails for walking, jogging, hiking, and cycling
  - Recreational and commercial boating (motorized and non-motorized)
  - Improved public access to baylands including Americans with Disabilities Act requirements
iii. Maintain flood protection for Alviso
iv. Use of the Alviso Bay Trail access as a means to attract visitors to explore additional areas in historic Alviso through the use of self-guided history tours and the development of a visitor's center, possibly near the old Cannery building.
v. Enhance the potential for re-use of the historic Cannery building, or at least interpretation of this site and its connection to the Bay and Alviso.
vi. Improve the opportunity for the future development of a marina by other entities near or along Alviso Slough that could include public waterfront access and related enhancements. Such a marina project could be coordinated to connect with the City of San Jose's plan to build a pedestrian bridge over Alviso Slough to join the "Legacy" property to the south (new Bay Trail spine alignment).
vii. Help integrate plans for specific trail proposals within the community of Alviso as a way of enhancing visitor use of the area.
viii. Integrate interpretation and education into the restoration plan for Alviso Slough and ongoing planning for the SBSP Restoration Project.
ix. Provide additional local connector trails between the waterfront and the community of Alviso to augment the Bay Trail spine and City of San Jose alignments.
x. Restoration of Pond A8 to tidal habitat will contribute to the long-term goals and objectives of the SBSP Restoration Project, with potential benefits for small craft boating (recreation) along Alviso Slough.
xi. The USACE has a Programmatic Agreement for Lower Guadalupe for Section 106 requirements regarding protection of cultural resources; coordination with the South Bay Salt Ponds project team regarding the Section 106 consultation may result in time savings (verification of the Agreement is underway).
xii. Enhanced aesthetics
xiii. Reduced mosquito nuisance
xiv. Potential to enhance wildlife and fisheries habitat

xv. Potential to improve sediment quality in Alviso Slough through removal or remediation

A constraint is defined as factor that may limit the selection of project alternatives or that may limit the extent to which the project objectives can be met. The initial opportunities and constraints identified below influence the ability to achieve target objectives and may drive design parameters. The following constraints are identified for the project:

i. The existing wetlands may be viewed as high value native marsh that should not be impacted without a valid, water dependent project purpose.
ii. Mitigation and/or maintenance requirements may be expensive, time consuming, or land intensive.
iii. Regulatory agencies may require special consideration of invasive plant species and native plant species during the permitting and mitigation.
iv. Existing infrastructure (bridges, utilities, active railroad, levees along the right bank of the slough, buried concrete slab at the Old Union Warehouse [Gross Building])
v. Possible buried rubble in slough from former landfill and dumpsite in vicinity of Pond A8; possible sunken boats in slough; abandoned boats and materials in vegetation at South Bay Yacht Club
vi. The presence of Special Status species may require additional agency consultation, field studies, and/or expensive mitigation, or could impede permit acquisition.
vii. Right-of-way issues, such as access or easement restrictions
viii. The project will attempt to minimize impacts and will mitigate for all significant environmental impacts.
ix. Possible limited staff and budget of managing agencies.
x. Mercury and other contaminants present in sediments of Alviso Slough and Guadalupe River in the project location.
xi. The SBSP Restoration Project has not yet finalized all of the project alternatives for Pond A8. The restoration of Pond A8 as part of the SBSP Project may not create the conditions conducive to naturally trigger the restoration of the Alviso Slough, or it could take many years. Additionally, the breaches to Pond A8 could be closed (i.e., Alviso Slough connections removed) based on results of the studies.
xii. Pond A8 currently provides flood overflow storage and conveyance of Guadalupe River/Alviso Slough flows via the overflow weir along Alviso Slough. Phase 1 of the SBSP Project is an opening of Pond A8, in reversible fashion, so as to allow for data collection, monitoring, and analysis. Since SBSP Phase 1 actions must not worsen current levels of flood protection, the existing flood storage function of Pond A8 may limit the amount of tidal scour along Alviso Slough. The Phase 1 breach may be closed during the wet months depending on operational considerations. Seasonal management would continue until channel scour and associated increases in conveyance completely offset loss of flood storage.
xiii. Seasonal management of Phase 1 actions at Pond A8 may slow or limit the amount of channel scour along Alviso Slough until year-around operations could be implemented.
xiv. The South Baylands Mercury Study, as part of Phase I of the SBSP Project, is to take place over 3 years, and the data may not be complete in time for use in the Alviso Slough Planning Study.
xv. Permitting requirements.

ES-3. REFINED OBJECTIVES

The initial project objectives defined in the Project Plan were analyzed based on data gathered on the current environmental, social, and regulatory conditions. The revised objectives will be used to develop and evaluate project alternatives that will eventually be assessed under state California Environmental Quality Act (CEQA) and federal National Environmental Policy Act (NEPA) requirements. The CEQA and NEPA documents which provide the basis for issuance of necessary permits will require a clear set of objectives to support the Lead Agency's analysis of the feasible range of alternatives. The following revisions to the original objectives are suggested:

Original Objective (2004 Project Plan)	Rationale for Modification	Proposed Refined Project Objective
1. Remove 7 acres of vegetation and root mass to a depth of 4 feet between the Gold Street Bridge and County Marina.	The objective should state the desired outcome, not the proposed action. While the action as stated at left may be the desired or proposed project, the objective should be stated so as to allow other alternatives that could accomplish the same underlying goal. Recommendation: Combine and modify original objectives #1, #2, and #7.	Restore Alviso Slough's channel width and habitat to prior to 1983 conditions. [Note : Removal of 7 acres of vegetation and root mass to a depth of 4 feet between the Gold Street Bridge and County Marina could be one method of achieving this objective]
2. Restore the slough's open water channel width to prior to 1983 conditions.	See #1	---
3. Improve navigation so the community can expand on boating and other recreational opportunities.	Expanding recreational opportunities can also be accomplished with better access and aesthetics. Also relates to tourism, which the AWTF would like to promote. Recommendation: Modify and combine with #4.	Improve the community's ability to pursue navigation, public access, and aesthetics to allow for the expansion of boating and other recreational and/or tourism opportunities.
4. Restore historic public access and aesthetics for the Alviso community.	The access and aesthetics issues relate to persons beyond those within the Alviso community, and the reference to historic conditions is vague. Recommendation: Modify and combine with #3.	---
5. Maintain one-percent flood protection in Alviso Slough.	No change.	Maintain one-percent flood protection in Alviso Slough.
6. Reduce mosquito nuisance.	No change.	Reduce mosquito nuisance.
7. Expand open water habitat and inundated mudflat habitat of the slough.	See #1	---

Original Objective (2004 Project Plan)	Rationale for Modification	Proposed Refined Project Objective
8. Promote the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.	Add specific reference to the Pond A8 Applied Study.	Promote the integration with the Salt Pond Restoration Program (including the Pond A8 Applied Study) to bring salt water connections to the Lower Guadalupe River.

ES-4. NEXT STEPS

The Planning Study will include the following major tasks.

Community Planning Strategy, including Cost/Benefit Analysis

This District will prepare a qualitative cost/benefit analysis of each alternative to assess the preferred project alternative and the best course of action for project implementation from a community development perspective. This will include an analysis of the beneficial and adverse economic impacts associated with the project and its alternatives. The analysis will also consider different strategies for project implementation, and which will best achieve the project goals.

Public Input

Public input will be sought at key times during the project, such as during identification of project alternatives, identification of key issues, and after distribution of the draft environmental report (CEQA/NEPA document). Furthermore, District staff will continue to work collaboratively with the AWTF throughout this project. The District has also established a permanent liaison between the District and AWTF to facilitate communication and information exchange.

Coordination with South Bay Salt Ponds Restoration Project

Restoration of Pond A8 as part of the SBSP Restoration Project may create the conditions conducive to naturally trigger the restoration of the Alviso Slough over the longer term. Discussions with the SBSP Restoration Project team, District, and AWTF to identify the timing and methodology will be required to integrate the two projects successfully.

Permit Strategy Study

The various permitting and resource agencies will be contacted on a preliminary basis to gather information on permit conditions. Given the nature of the project, its location, and the variety of permits required, a presentation at the Corps of Engineer's interagency coordination meeting is the logical first step in crafting a permit strategy. This meeting will involve all pertinent resource agencies and will enable the District to solicit pre-application input on the proposed project. Based on the input received at this meeting, the permit strategy will be developed.

Sediment and Water Quality Study

Sediment sampling and analysis of sediment chemistry within Alviso Slough will likely be necessary to support the Clean Water Act Sections 401 and 404 and Section 10 of Rivers and Harbors Act permit processes, analyze the impacts of the proposed alternatives, and develop mitigation measures if necessary.

Fisheries Study

No additional fisheries studies are anticipated beyond the current scope for this Planning Study.

Recreation Study

The Planning Study will include an investigation of existing recreational uses in the area including boating, fishing, wildlife viewing, walking, and cycling, and will provide a preliminary basis for potential future recreation projects in the area in light of restoring the slough's width and depth. On-site data collection will be supplemented with interviews with key community user groups and interests, and interviews with agency personnel responsible for adjacent recreation areas.

Vegetation/Wetlands and Wildlife Study

No additional vegetation / wetland or wildlife studies are anticipated beyond the current scope for this Planning Study.

1. BACKGROUND

1A. ALVISO COMMUNITY AND ALVISO SLOUGH

Alviso is located along the edge of the San Francisco Bay, seven miles northwest of downtown San Jose, in the natural floodplains of two major freshwater watercourses, the Coyote Creek and the Guadalupe River (Figure 1). Alviso Slough now functions as the tidal slough channel portion of the Lower Guadalupe River that connects the river to Coyote Creek and South San Francisco Bay. It is the last reach of the Guadalupe River before it enters open waters of San Francisco Bay. The river flows north from the Santa Cruz Mountains through downtown San Jose. Today, the Alviso Marina County Park (County Marina), Don Edwards San Francisco Bay National Wildlife Refuge, and salt ponds occupy most of the area around Alviso.

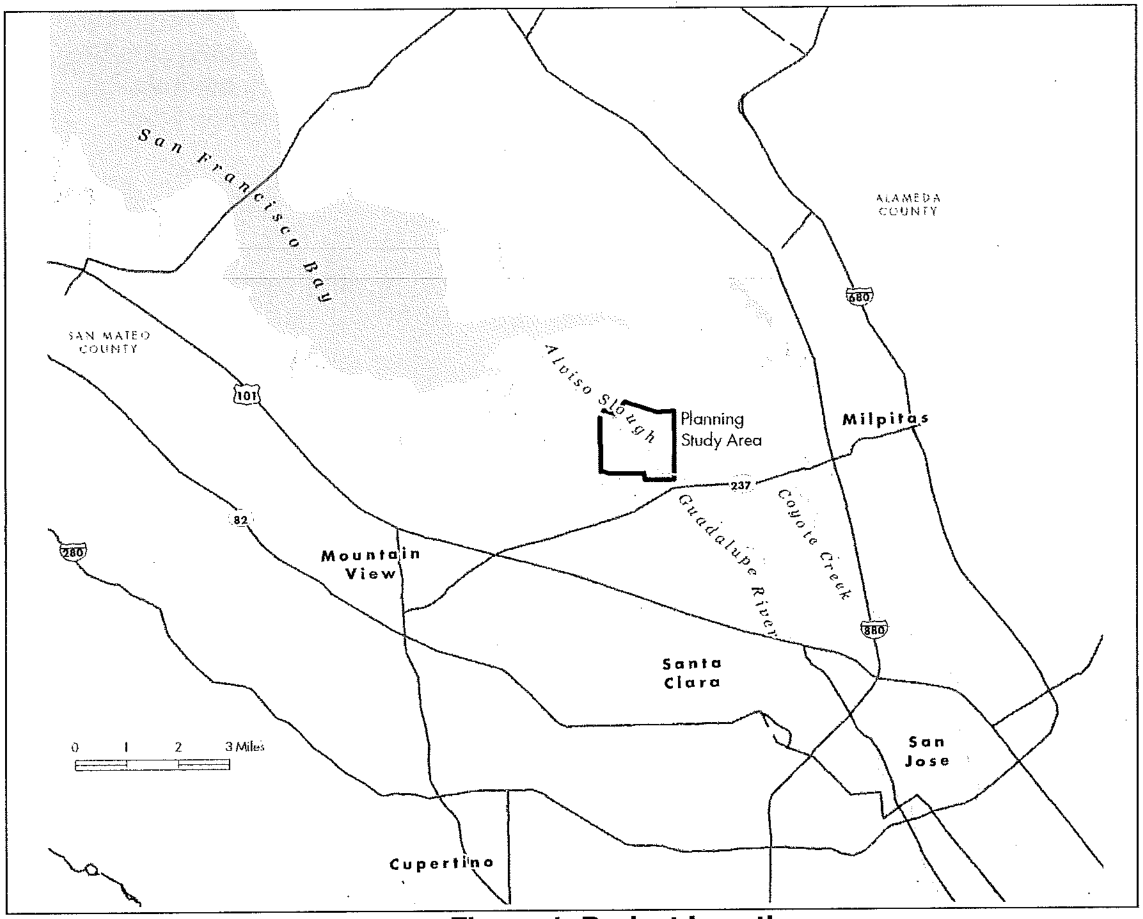


Figure 1. Project Location

The community of Alviso is located on the east bank of the Alviso Slough, and its location provided a prime opportunity to become one of the oldest ports on the West Coast of the United States.

Historic records indicate that the first official town survey was conducted in 1849. Alviso was incorporated in 1852 and consolidated with the City of San Jose in 1968. The development of the quicksilver mines at New Almaden in 1845, and for many years after, played a large part in the shipping industry at the small port. Significant dredging of Alviso Slough occurred in 1900 in an effort to improve commerce; steamboats and schooners were able to transit the Slough in the early 1900s. Surveys in 1902 and 1904 indicated that sediments from the Guadalupe River were filling in the Slough, and the area was dredged again in 1905 by the U.S. Army Corps of Engineers. Shortly thereafter, maritime trade at Alviso steadily declined, as it could not compete with the railroad.

The Guadalupe River formerly flowed northwest, through what is now Pond A8 (Figure 2), and entered the Bay through Guadalupe Slough. With the creation of the salt ponds, and in conjunction with early flood control solutions, the Guadalupe River was diverted into Alviso Slough, connecting very near the location of the project study area. An early marina was created on the west side of the slough, at precisely the point where the river would have crossed the new salt pond. Both sides of Alviso Slough were leveed to create the salt ponds in the 1940s.

Alviso, as with much of the northern part of San Jose, experienced a gradual land subsidence caused by overpumping of groundwater in the first half of the 20th century. This subsidence added to the flooding problem described below and required the construction of higher levees to protect the town from flooding during large storms. Non-engineered salt pond levees were maintained by Cargill (and other salt production companies before it) to protect its industrial interests, which, incidentally, also benefited Alviso. The levees provide a physical barrier to tidal flooding.

In the early 1960s, the District, then known as the Santa Clara County Flood Control and Water Conservation District, undertook a project to build up existing levees from the bay and realign (straighten) approximately 1.6 miles of the meandering Alviso Slough channel downstream of Highway 237.

By reducing the area of tidal marsh that drained into Alviso Slough, the salt pond levees also reduced the tidal prism of that channel, thereby reducing the natural scouring action that kept the channel open in the past. Alviso was nonetheless subject to periodic flooding, both from the Guadalupe River and Coyote Creek. After a major flooding of Alviso in 1983 from Coyote Creek overtopping the levee, a ring levee was constructed on an emergency basis to protect the community. That ring levee was built largely with fill from a local quarry and contained asbestos-laden serpentine soils that were later determined to be unsuitable and unsafe for citizens of Alviso. Therefore, once the Lower Coyote Creek Flood Control project was completed in the late 1980s the Alviso ring levee was dismantled.

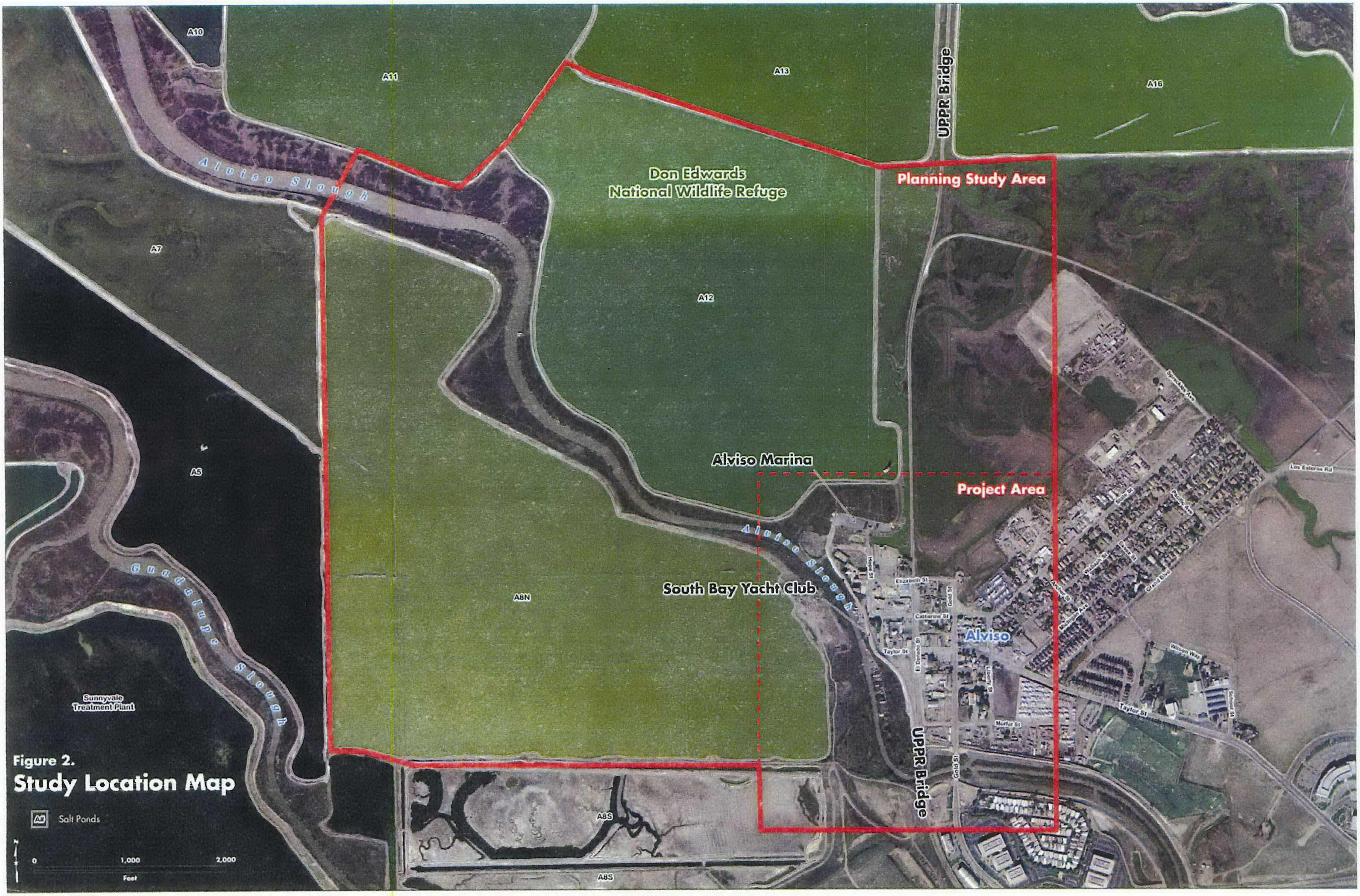


Figure 2.
Study Location Map

The Guadalupe River was also the focus of a series of flood control projects. The Lower Guadalupe River flood control project upstream of the Gold Street Bridge in Alviso was completed in the early 1980s. The Alviso reach of this flood control project was completed soon thereafter. However, by 1995, the flood control capacity of the channel had been reduced by further sedimentation, and the Santa Clara Valley Water District needed to apply a levee cap of several feet to prevent flooding into Alviso. This action led to the most recent Lower Guadalupe River Flood Protection Project.

Between 2002 and 2004 the District constructed the channel improvements for the current Lower and the Downtown Guadalupe River Flood Protection Projects, which provide flood protection from overbank flooding from I-280 in San Jose to the County Marina. The project includes a combination of floodwalls, levees, and channel improvements. Downstream of Gold Street in Alviso, flood flows in excess of the channel capacity will flow over the diversion weir into Pond A8. For large flood events, Pond A8 would overflow the interior levees within the salt pond system and flood Ponds A7, A5, and A6.

Since the 1940s, Alviso Slough has been subject to various changes due to the dynamic interaction of the Slough and Bay over time. These changes include sediment flux (cycling) between Bay Marsh and the Slough, additional height added to the salt pond levees mainly by scooping and piling soft Bay muds to maintain levee elevations due to the subsidence of Alviso, and changes to vegetation presence, abundance, and plant community types. Over the years, due to many man-made factors and natural processes, the vegetation in the slough has grown and thrived, thereby reducing the extent of open water.

In 2003, an Interim Stewardship Plan (ISP) was released as part of the overall South Bay Salt Pond (SBSP) Restoration Project. The ISP is intended to cease salt making operations and manage the salinity of the ponds while a long-term plan is crafted for future habitat restoration. The ISP has a series of management prescriptions of the ponds that adjoin the project site. The ISP operation for the Alviso Pond A8 began in 2005 and will continue for at least 4 to 5 years during the planning of the long-term restoration. Pond A8 is currently being managed as a seasonal pond, which typically has a salinity of <40 parts per thousand (ppt), partially filling with rainwater during the winter and drying during the summer due to evaporation. However, adaptive management strategies for the ISP include system-specific alternatives to allow management flexibility. Individual ponds or pond systems may be converted to the long-term restoration conditions in a series of subsequent phases. Phase 1 of the restoration is anticipated to begin in 2008-2009.

The community of Alviso advocates returning the slough to its pre-1983 conditions, and has a strong desire to create a model project that combines effective flood protection, habitat enhancement and restoration, and recreation improvements. Information from the community about local conditions will be used to supplement reports and data collected from agencies or other means.

At a site visit in May 2006 (Alviso Water Task Force [AWTF], Santa Clara Valley Water District, and Planning Study contractors in attendance), George Trevino, Lurdes Rivera, and Tom Laine spoke at length about the previous conditions in the slough and at the marina. Mr. Trevino spoke about restoration of the slough to 1980s condition and the need to improve the habitat. Ms. Rivera shared photographs taken in 1986 showing water skiing along a wider Alviso Slough. Tom Laine reminisced about shrimp harvesting in the area when he was a young boy, and described how bringing in salt water would be a mechanism for controlling the tule growth in Alviso Slough in the long-term. Finally, all parties present agreed that there is a need to look at the Alviso Restoration Project in the context of the larger SBSP restoration effort. One view was that removing the vegetation will be a small step - a short term effort; the long-term solution probably lies in getting a bigger tidal prism operational to create scour and increase salinity levels within Alviso Slough.

Ms. Rivera also noted that the Task Force objectives are (in order):

1. Restoration;
2. Recreation – more people coming to Alviso to enjoy the clean air, trails, birds and wildlife, historical town; increase tourism; connect to City of San Jose trails; and
3. Flood Control – free from the fear of floods.

The AWTF presented the New Chicago Marsh, managed by the USFWS, as a successful wetland restoration project and reference site for restoration of the Alviso Slough wetlands. Mr. Laine led a tour of the adjacent salt ponds and Alviso Slough, pointing out important features, such as: locations and importance of historic sloughs, channels, and flows; key levees and critical points in those levees; the flood gates at the County Marina, points of concern for flood overflows; water control features in the existing salt ponds, management practices, and areas of hydrologic interaction; salinity ranges of the various salt ponds; fisheries resources and historic fishing spots; and historic land use.

1B. ALVISO SLOUGH RESTORATION PROJECT PLANNING STUDY

The District is the primary water resources agency for Santa Clara County, California. It acts not only as the county's water wholesaler, but also as its flood protection agency and is the steward for its streams and creeks, underground aquifers and district-built reservoirs. The District's stream stewardship goals include creek restoration, pollution prevention, endangered species protection, watershed management, and a commitment to natural flood protection.

As part of its efforts in preparing the Planning Study for the Alviso Slough Restoration Project, the District will document existing environmental resources and conditions, formulate preferred alternatives, meet project objectives, and investigate project impacts to comply with applicable environmental laws and regulations. Tasks will include collection of data, development of alternatives, identification of environmental impacts, feasibility assessment, formulation of recommended alternatives, and development of measures to avoid, reduce and mitigate project impacts. The District will continue to work in close coordination with the AWTF and community of Alviso to accomplish these tasks.

The future products of the planning process are (1) environmental documents, (2) a regulatory permit strategy, and (3) an Engineer's Report, as follows:

1. The District will prepare an Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA). The project is also subject to the National Environmental Policy Act (NEPA), as there is a federal "nexus." A nexus is considered when the project requires a federal discretionary permit, in this case a permit under the federal Clean Water Act (Section 404). The U.S. Army Corps of Engineers will be the federal Lead Agency preparing either an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) under NEPA to support the Section 404 permit.

2. The regulatory permit strategy report will provide a pre-permitting assessment of all applicable or potentially applicable regulatory permits of the Preferred Project Alternative and all Project Alternatives.

3. The Engineer's Report will provide sufficient information to allow the District's Board of Directors (Board), as the decision-making body of the District, to approve the project. This includes 30 percent design plans of the preferred alternative.

This Problem Definition Report serves as the initial step in the overall Planning Study. The Planning Study area is presented in Figure 2.

The Alviso and Lower Guadalupe Collaborative (ALGC) was formed to collectively work toward effective flood protection, habitat enhancement and restoration, and recreation in the Alviso area. The Collaborative participants include District staff and the AWTF, which consists of Alviso residents, interested parties, and legislators. The ALGC strives to work together to successfully achieve Alviso project goals.

In collaboration with the AWTF, the District prepared a Project Plan for the Alviso Slough Restoration Project. This Project Plan sets forth the following project objectives:

- Remove 7 acres of vegetation and root mass to a depth of 4 feet between the Gold Street Bridge and County Marina.
- Restore the slough's open water channel width to prior to 1983 conditions.
- Improve navigation so the community can expand on boating and other recreational opportunities.
- Restore historic public access and aesthetics for the Alviso community.
- Maintain one-percent flood protection in Alviso Slough.
- Reduce mosquito nuisance.
- Expand open water habitat and inundated mudflat habitat of the slough.
- Promote the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.

Establishing these objectives was an important step in defining the community's interests and expectations. After a review of the existing conditions and other factors (see section 2), some changes to the project objectives are suggested (see section 6), to be further explored or developed through the planning process.

1C. RELATION TO PAST OR PRESENT STUDIES, PROJECTS, PROGRAMS, REGULATIONS BY DISTRICT OR OTHERS THAT MAY IMPACT THE CURRENT PLANNING STUDY

South Bay Salt Pond Restoration Project

The South Bay Salt Pond (SBSP) Restoration Project is the largest tidal wetland restoration project on the West Coast. When complete, the restoration will convert 15,100 acres of commercial salt ponds at the south end of San Francisco Bay to a mix of tidal marsh, mudflat and other wetland habitats. The property was purchased by the State of California and the Federal government from Cargill Salt as part of a larger land transaction that includes 1,400 acres of salt crystallizer ponds on the east side of the Napa River. The acquisition of the South Bay salt ponds provides an opportunity for landscape-level wetlands restoration, improving the physical, chemical, and biological health of the San Francisco Bay. The goals are to restore and enhance a mix of wetland habitats, to provide wildlife-oriented public access and recreation, and to provide for flood management in the South Bay.

The Alviso Slough Restoration Project provides an opportunity to integrate with the SBSP Restoration Project, including Phase 1 actions at Pond A8 (South Baylands Mercury project and restoration of wetland functions, to the extent possible given physical and biological constraints), located adjacent to the Alviso Slough. The preferred conceptual design alternative involves installing an armored notch in the Pond A8 levee in the vicinity of the District's existing weir. This notch would be gated to allow seasonal closure of the tidal connection, as appropriate, for flood protection and water and sediment quality issues. The restoration of reversible wetland functions is intended to inform about aspects of the long-term restoration and avoid potential adverse environmental impacts until mercury bioaccumulation is better understood.

While the design of the Phase 1 actions at Pond A8 are still under development, constraints related to flood protection, nesting birds, and cost are expected to limit the amount of channel scour of the reversible tidal action. Therefore, alternatives developed for the Alviso Slough Restoration project need to consider the expected lifecycle of SBSP Phase 1 actions and the timeframe for full tidal restoration of Pond A8 and other ponds adjacent to Alviso Slough. Additionally, any proposed actions along Alviso Slough will consider the location of new flow control structures (e.g., culverts) to be installed as part of SBSP Phase 1.

Restoration of Pond A8 to partially tidally-influenced conditions will contribute to the long-term goals and objectives of the SBSP Restoration Project, and perhaps to the long term goals of the restoration of Alviso Slough.

Lower Guadalupe River Flood Protection Project

The District began construction in early April 2003 on the Lower Guadalupe River Flood Protection project. The intent of this flood protection project was to improve the channels to convey storm water runoff from up to a 1 percent (100 year) flood event, protect endangered species, preserve fish and migratory bird habitat, and allow for open-space recreation.

The District made flood protection improvements and conducted mitigation planting along 6.5 miles of the Guadalupe River from the I-880 bridge north to the County Marina. Project work included: construction of floodwalls or raising levees along the river banks; replacement of the Highway 237 eastbound bridge; modification of 19 storm drain outfalls; improvement and construction of maintenance roads and undercrossings; construction of an overflow weir to divert high flows into one of the salt ponds; improvement of the west perimeter levee around Alviso, and construction of grade-control weirs (gradual drops in the stream elevation). The project also featured enhancements, which included providing maintenance roads suitable for use as recreational trails.

Long-term operation and maintenance elements of this project include management of vegetation and sediment from below the UPRR bridge to Highway 237; use of temporary pumps in the salt ponds after major storms to restore capacity following large flow events; and planting of native vegetation.

City of San Jose Marsh Studies of the South San Francisco Bay

To document the changing biological conditions in the South Bay, the City of San Jose commissioned a more detailed study of the marshes starting in 1989 (H. T. Harvey & Associates 1990). Simultaneously, the Sunnyvale Water Pollution Control Plant (WPCP) commissioned a study of the vegetation of the marshes in Guadalupe and Alviso Sloughs. Subsequent mapping studies were conducted by the City of San Jose in 1991, 1994, and annually thereafter. These studies documented changes in the distribution and extent of salt, brackish and freshwater marsh (CH2MHill 1989, H.T. Harvey & Associates 1990a, 1990b, 1991, 1995, 1997, 1998, 1999, 2000, 2001a, and 2002). Beginning in 1994 it was recognized that the Alviso Slough mapping, conducted for the Sunnyvale WPCP, could serve as a reference area for the City of San Jose's vegetation mapping. Therefore, the City of San Jose's mapping efforts since 1995 have included Alviso Slough.

Much of the conversion of salt marsh habitats within South San Francisco Bay is likely caused by large-scale influences that are affecting the entire system. This includes both anthropogenic (influenced by humans) and environmental factors, such as the reduction in tidal prism from the conversion of tidal marsh to salt ponds, and seasonal and anthropogenic changes in freshwater flow patterns. To better understand the causes of habitat conversion, monitoring of water levels, salinities and selected edaphic (i.e., influenced by soil rather than by climate) characteristics was performed in 1999 and 2000 by the City of San Jose (H.T. Harvey & Associates 2001b).

These studies have aided in our understanding of the variety of factors that are influencing shifts in the vegetation communities in Alviso Slough.

The South Baylands Mercury Project

The South Baylands Mercury Project is jointly sponsored by San Francisco Estuary Institute (SFEI), United States Geological Survey (USGS) and the District. SFEI's goal is to study wildlife response to increased mercury exposure. USGS is studying mercury methylation processes, and the District is conducting sampling to determine pond and slough's water column and sediment chemistry. The project began in 2006 and is expected to be a three-year monitoring program focused on Pond A8, Alviso Slough, and will include other reference areas within the South Bay Salt Pond Project Area.

South San Francisco Bay Shoreline Study

The South San Francisco Bay Shoreline Study is a Congressionally-authorized study being performed by the US Army Corps of Engineers (USACE) together with local sponsors to identify and recommend for Federal funding one or more projects for flood damage reduction, ecosystem restoration and related purposes such as public access. The Shoreline Study will be funded through a partnership among the USACE, SCVWD, and the California State Coastal Conservancy (Conservancy). The U.S. Fish and Wildlife Service (USFWS) and other land-owning agencies within the project area will also be involved in the planning process.

The study will be performed through several "Interim Feasibility Studies", the first of which will investigate flood protection for all Santa Clara County Baylands, from Palo Alto to Alviso, in addition to the restoration of former salt production ponds within the Alviso Pond complex and adjacent properties such as areas around Moffett Field.

Various flood protection strategies will be examined, such as increasing flood capacities of local creeks by widening the mouths of waterways and reestablishing historical flood plains. Although flooding risks from individual creeks have been reduced by a number of existing projects in the area, the Shoreline Study area remains vulnerable to tidal flooding. In Santa Clara County, there are several streams that carry runoff through the valley and north to San Francisco Bay. The two largest rivers — the Guadalupe River and Coyote Creek —have been retrofitted to provide flood protection to most communities along their banks, including the community of Alviso in north San Jose. However, it is the Shoreline Study that will address protection from tidal flooding in these communities.

The USACE completed an initial reconnaissance analysis in September 2004, which determined that due to the current and future anticipated conditions in the South Bay, it was likely that a Federal flood-control and ecosystem restoration project would be justified. In August 2005, the project partners completed a Project Management Plan to outline how the work would be conducted. On October 24, 2005, the Corps, SCVWD, and the Conservancy kicked off the first study phase of the South San Francisco Bay Shoreline Study and are now in the preliminary stages of beginning environmental review. The project is currently undertaking "scoping" to determine the range of environmental issues to be addressed in the alternative development and analysis process.

2. EXISTING CONDITIONS

Existing conditions include the past and present environmental surroundings and social circumstances, as well as any regulatory guidelines that dictate certain activities in the area. These conditions produce assumptions, constraints and/or opportunities that should be considered in developing sound recommendations to meet, or refine, project objectives, which are detailed in Section 5.

For purposes of this discussion, the historic reference setting is defined as conditions prior to present-day (including 1983 and before), and the existing conditions, or baseline conditions, refer to present-day.

There is substantial information about key resources in the region, and specific studies will follow in 2006 and 2007 as part of this Planning Study to help define the sensitive resources and environmental or regulatory constraints specific to this project.

Impacts that could occur to these resources as a result of the restoration project (a specific project, or action, has yet to be determined) will be addressed in subsequent environmental reports. The CEQA Appendix G checklist (available here: http://ceres.ca.gov/ceqa/guidelines/appendices.html) will be the basis of determining significant environmental issues and constraints. While CEQA and NEPA documentation will address all of the required topics, this problem definition report focuses on the known key resources that have the potential to be affected by a project in Alviso Slough. Based on known existing conditions, preliminary opportunities and constraints to achieve the project objectives were also identified.

2A. TERRESTRIAL AND AQUATIC BIOLOGY

2A-1.Historical Conditions

Historically, tidal marshes were the dominant habitat throughout much of the South San Francisco Bay. The vast area dominated by marshes included Alviso Slough, in the lower reaches of the Guadalupe River. The Slough, subject to tidal action, had abundant water flow in from and out to the Bay. This water flow continually scoured the channel and kept it relatively free of sediment build-up. Prior to the 1940s, Alviso Slough was a broad channel with an extensive salt marsh on either side. After levees were built in the 1940s to create salt ponds, the dynamics of water flow in the channel began to change. The levees sealed off much of the South Bay from tidal action and in turn water flow in the Slough decreased, causing the channel to fill in with sediment.

In the 65 or so years since the construction of the levees, Alviso Slough has undergone dynamic changes, both physical and biological. After the levees were built, groundwater pumping led to subsidence throughout the region. As a result, land around the town of Alviso sank up to 10 feet. In the slough, this sinking of the channel resulted in a deeper channel in relation to tidal levels, and the deeper waters could no longer sustain marsh plants. Additionally, the levees themselves sank. The District and the salt pond operators repeatedly raised the height of the levees to counteract this trend. Subsidence began to slow starting in 1965 and the channel slowly refilled with sediments in an effort to restore an equilibrium condition, though it took years for marsh plants to reestablish. The presence of this newly established vegetation helped accelerate the process of sedimentation.

Aerial photos spanning the past 60+ years clearly demonstrate changes in channel width (Figure 3). From 1939 to 2004, the width of the channel at two fixed reference points decreased substantially. The channel width at location A, between Ponds A8 and A11, indicates an overall loss of 230 feet of slough width (Figure 3). The channel width at location B, upstream from A and between Ponds A8 and A12, shows an overall loss of 93 feet of slough width (Figure 3). These aerial photos demonstrate the gradual shifts in the structure of Alviso Slough over time. The residents of Alviso have corroborated these changes in channel width, and subsequent increase in vegetation, over the years. In fact, stories of water skiing in a vegetation-free Alviso Slough in the late 1970's were not uncommon (Rivera, 2006). In contrast, Photos 1 and 2 show recent conditions near the South Bay Yacht Club clubhouse.

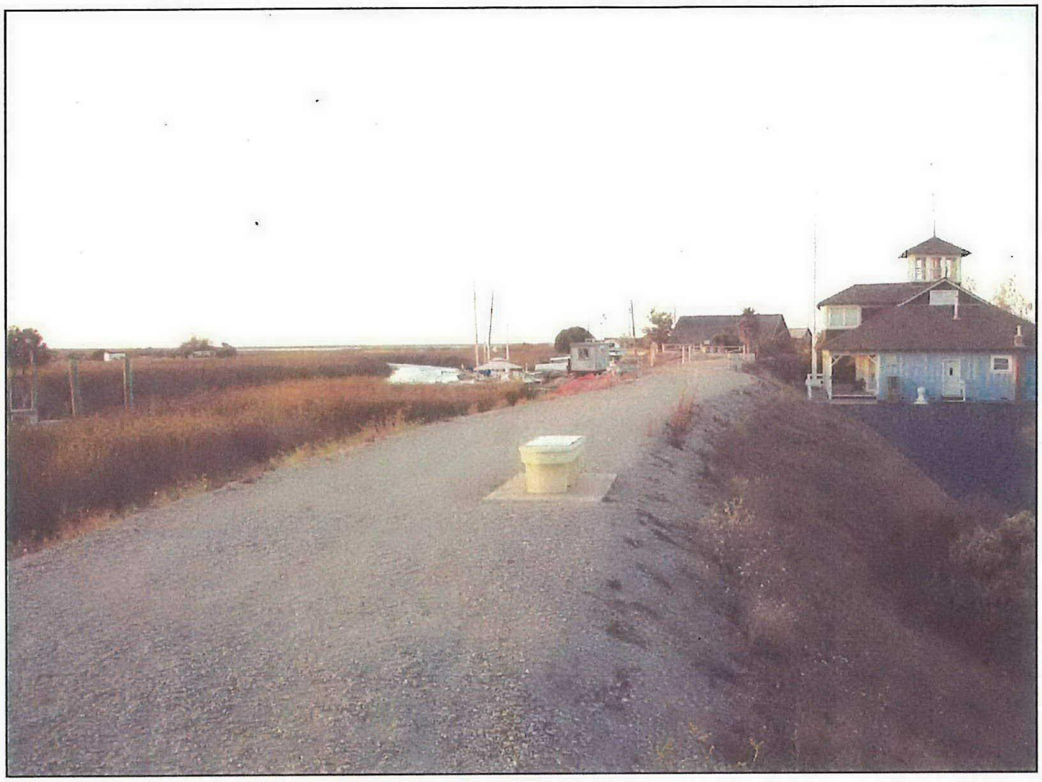


Photo 1.
South Bay Yacht Club clubhouse and Alviso Slough, a view looking north along the levee.

Jim Vogel, EDAW, c. 2005

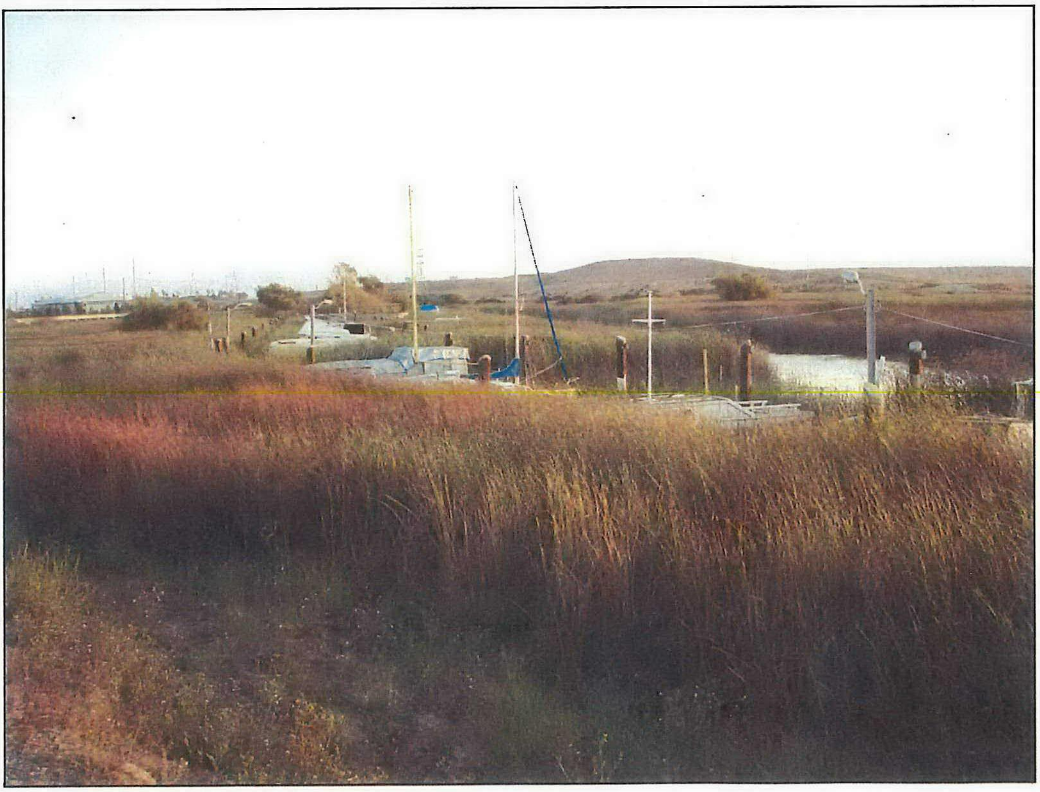
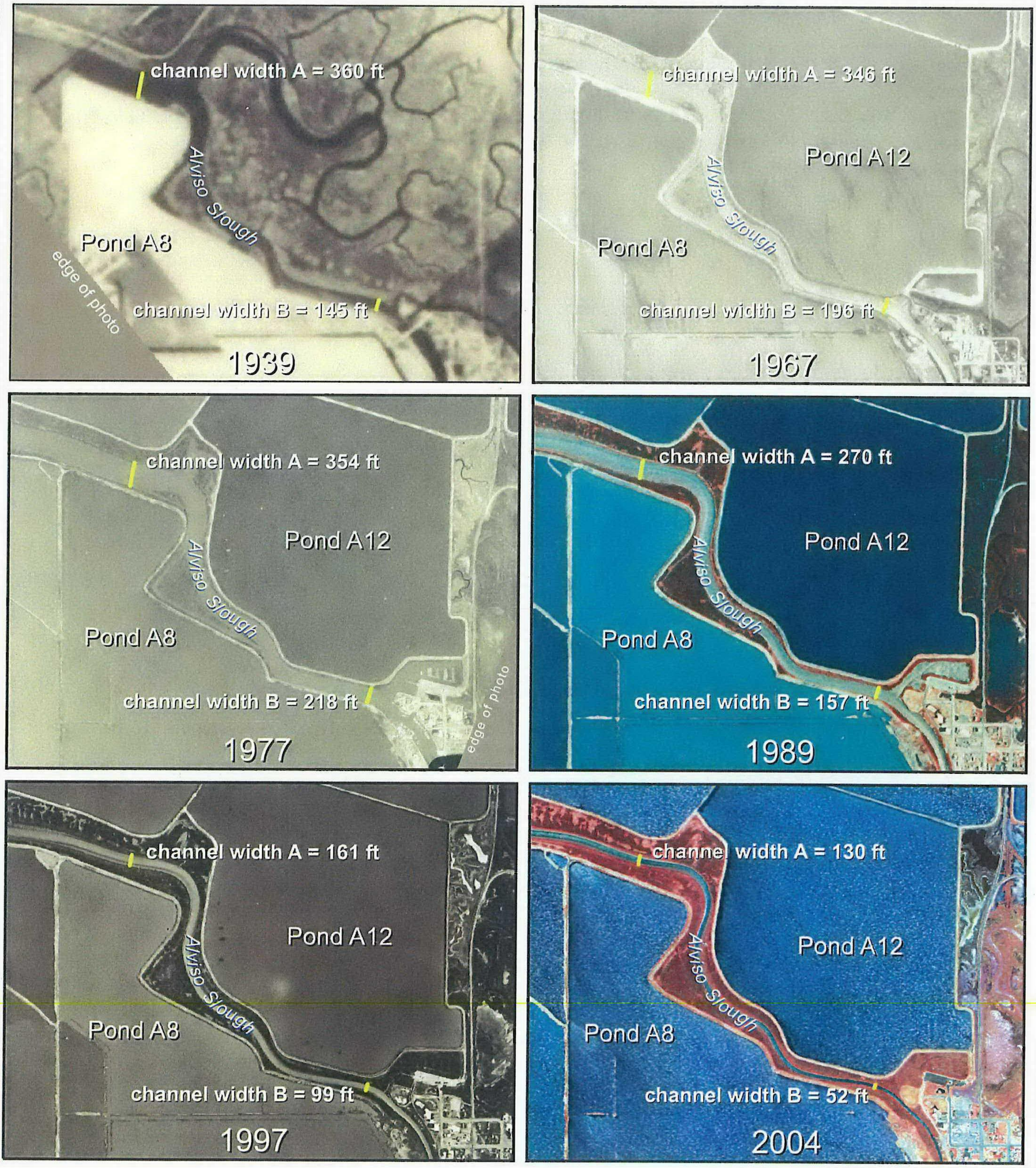


Photo 2.
Alviso Slough, a view looking south from the South Bay Yacht Club clubhouse.

Jim Vogel, EDAW, c. 2005



H. T. HARVEY & ASSOCIATES

ECOLOGICAL CONSULTANTS

Alviso Channel Widths, 1939 - 2004

File No. **2671-01**	Date **7/7/06**	Figure **3**

Figure 4 presents the estimated channel width over time, based on the historical aerial photographs in Figure 3. There is a sharp reduction in width at both channel sections that occurred after the 1977 photo in Figure 3. It appears that the dynamic changes discussed in an earlier paragraph of this section, combined to reduce the Alviso Slough channel width dramatically in the past 25 years.

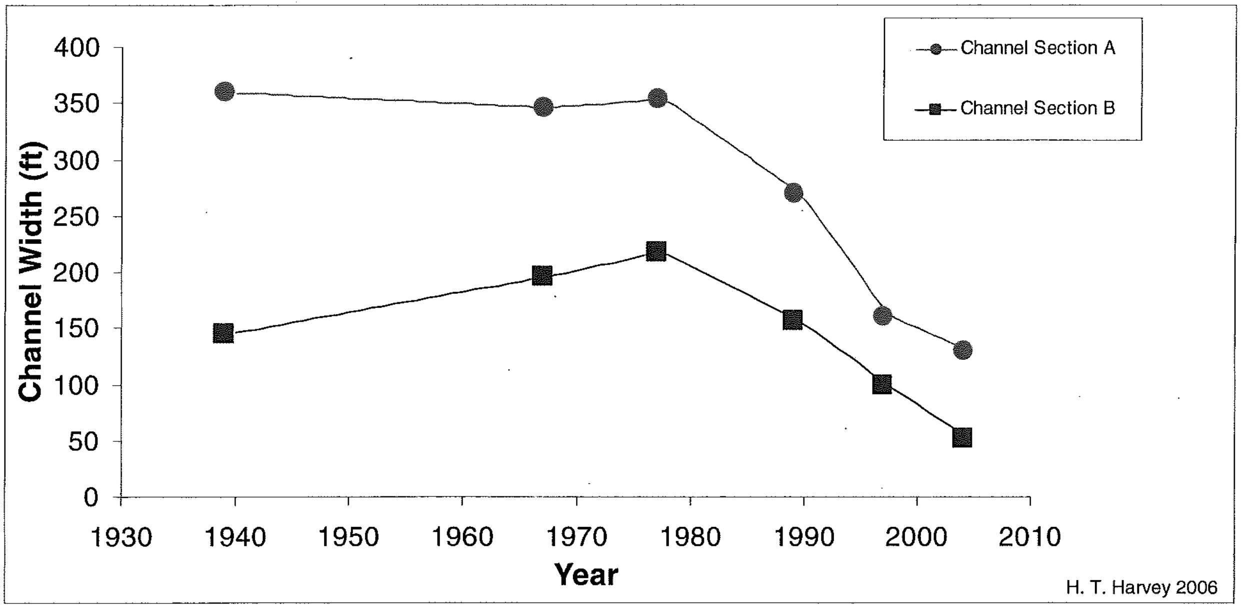


Figure 4. Alviso Slough Channel Cross-Section Widths, 1939-2004

2A-2. Vegetation

Under current conditions, abundant marsh vegetation has established itself along the edges of the channel, causing the width of the channel to decrease significantly. Presently, only a small channel exists (approximately 52 feet wide in 2004) and is continually shrinking due to lack of water flow similar to historic conditions (Figures 2 and 3; Photos 1 and 2). To permanently restore the channel width and create a sustainable waterway, tidal flow in the channel would have to be greatly increased.

Along with physical changes to the slough, changes in plant composition have also occurred. In the 1970's, studies by H. T. Harvey & Associates (1984) highlighted large-scale changes in marsh plant communities throughout South San Francisco Bay. Marshes once dominated by salt marsh plants such as pickleweed (*Salicornia spp.*) and cordgrass (*Spartina spp.*) were colonized by brackish marsh plants such as alkali bulrush (*Scirpus maritimus*). In the late 1980s, efforts were made to determine the extent of these changes over time by analyzing historical aerial photographs (CH2MHill 1989). Data suggested that large-scale vegetation changes were occurring not only through shifts in marsh type, from salt to brackish marsh, but also by the formation of new marsh habitat.

For the past 15 years, the City of San Jose and other agencies have monitored Alviso Slough through vegetation mapping to determine changes in marsh plant composition and to provide baseline data for future comparisons. San Jose's mapping program began in 1989 and has since continued on a nearly-annual basis. Mapping has been vital in detecting vegetation shifts that may have been otherwise undetectable. For example, mapping showed that 90.5 acres of new marsh formed in Alviso Slough from 1989 to 2005, a 54% increase. In this same period, 31.5 acres of salt marsh were converted to brackish marsh. Additionally, newly-formed freshwater marsh habitat was detected in Alviso Slough (beginning in the area of the Alviso Marina), which suggests that freshwater influences are playing an increasing role in structuring the marsh plant communities in the vicinity of the Alviso Marina (H.T. Harvey & Associates 2005). These freshwater influences include reductions in the amount of tidal influence reaching the Alviso Marina area as the Slough narrowed, changes to the quantity and timing of freshwater inputs upstream, and the changes to the historic slough-creek connections (H.T. Harvey & Associates 2005).

In addition to the changes in marsh plant communities, changes in wildlife populations have occurred. Historically, the South Bay contained a mosaic of habitats that supported diverse communities of animals. Utilization of Bay habitats by wildlife, particularly bird species, was high. Accurate historical bird counts are rare due to the lack of official survey data, but accounts from hunters and naturalists support the idea of high waterbird abundance and diversity. Hunters reportedly killed thousands of California Clapper Rails each week prior to 1900 (Thelander et al. 1994). However, habitat loss has been the major factor in the drastic decrease in population size of the California Clapper Rail (USFWS 1984; Albertson and Evens 2000). Salt marsh dependent species are no longer present in the upstream portions of Alviso Slough as the habitat has shifted to freshwater and brackish marsh. Local fishermen also report a shift in the fish being caught in Alviso Slough to more freshwater species (Laine, 2006).

Today, Alviso Slough contains a continuum of salt-, brackish-, and freshwater marshes. Freshwater marsh plants dominate the southern reaches of the Slough, which then give way to brackish and salt marsh species closer to Coyote Creek and South San Francisco Bay. Brackish marsh associations occur throughout the Slough, with the majority of brackish marsh plant species located mid-reach between the UPRR Bridge and the confluence of the Slough with Coyote Creek. Brackish marsh vegetation is dominated by alkali bulrush, but also consists of peppergrass (*Lepidium latifolium*), a non-native invasive species, and spearscale (*Atriplex triangularis*). Freshwater marsh associations are concentrated in the upstream portions of the slough around the town of Alviso, in the area of freshwater input from the Guadalupe River. Dominant freshwater species consists of California bulrush (*Scirpus californica*) and cattail (*Typha* spp.). The vegetation composition within these marshes is dynamic in nature and annual shifts in species composition are observed. However, the overall trend in vegetation in the area of the Alviso Marina over the past two to three decades has been a shift to fresher marsh types.

2A-3. Wildlife

Despite extensive habitat loss, degradation, and the invasion of non-native benthic invertebrates the South Bay's tidal marshes are still extremely productive. High productivity of the South Bay estuary and secondarily of alternative habitats, such as salt ponds, is largely responsible for the high abundance of many wildlife species, particularly that of waterbirds (H.T. Harvey & Associates 2005). Meanwhile, the high diversity of wildlife, and that of birds in particular, is supported by the South Bay's diversity of habitats.

Remnant tidal salt marshes provide habitat for endangered species such as California Clapper Rail and are an important source of nutrients for invertebrates living in intertidal and shallow subtidal areas (Warwick and Price 1975). These nutrients sustain a high abundance of invertebrates which in turn sustain large populations of fishes, both of which are a major food source for the myriad of shorebirds, waterfowl, herons, egrets, gulls, terns, grebes, and other waterbirds that use the South Bay (H.T. Harvey & Associates 2005). The South Bay is vital as a habitat for breeding, rearing, migrating, and wintering shorebirds.

Salt ponds, along with other alternative habitats such as artificial lakes or oxidation ponds of water treatment plants, also provide important habitat for waterbirds in the South Bay (Hanson and Kopec 1994; Harvey et. al 1992; Stralberg et. al 2003; Takekawa et. al 2000; Takekawa et. al 2001; Warnock 2004b). Many species of birds including Wilson's Phalarope, Red-necked Phalarope, Black-necked Stilt, American Avocet, Western Snowy Plover, Bonaparte's Gull, American White Pelican, and breeding gulls and terns nest and forage in the salt ponds, which provide higher-quality habitat than the existing marshes or intertidal zones (H.T. Harvey & Associates 2005). Birds commonly roost at high-tide on levees surrounding salt ponds, in shallow-water areas and bare-sediment habitat in salt ponds, and on islands and artificial structures such as boardwalks within the ponds themselves (Warnock et al, 2002).

Alviso Ponds A8 and A12, located immediately adjacent to the Alviso Marina area, provide a range of wildlife habitat values. Observations have shown that wildlife usage in Pond A8 takes a variety of forms. Notably, a large number of shorebirds use the pond to roost and forage. Forster's Terns nest within Pond A8 on small dredge-spoil islands having little or no vegetation, and Black Skimmers have nested on these spoil islands alongside Forster's Terns in recent years (Santa Clara County Bird Data, unpublished). An increasing breeding population of California Gulls in Pond A6 nearby threatens to encroach on these nesting terns and skimmers. An especially large concentration of nesting and roosting gulls occur in Alviso due primarily to the abundant food resources provided by South Bay landfills, and secondarily (for a few species) to foraging opportunities provided by the high abundance of invertebrates within mid- and high- salinity ponds. Bonaparte's Gull, whose abundance is highest in Pond A8, tends to forage on salt-pond-based prey.

The endangered California Least Tern uses the Alviso/Mountain View area as a post-breeding staging area rather than a nesting area (Santa Clara County Bird Data, unpublished). The staging area is occupied from late June through late August, prior to the species' southward migration. Here, adult and juvenile Least Terns roost on levees that surround the salt ponds as well as those that lie in between ponds (S. Rottenborn, pers. obs.). They also roost on boardwalks and forage both in the salt pond and over the open waters of the Bay. Least Terns have occasionally been recorded using Pond A8 for foraging and roosting, though they tend to concentrate in ponds farther west (Santa Clara County Bird Data, unpublished).

USGS also noted high abundances of Black-necked Stilts and American Avocets in Pond A8 (U.S. Geological Survey Unpublished Preliminary Data), and the federally threatened Western Snowy Plover breeds in Pond A8, at least in some years (Santa Clara County Bird Data, unpublished).

Alviso Pond A12, in comparison, has seen only limited use by wildlife due to its greater depth and higher salinity. Black-necked Stilts and American Avocets occasionally breed in low numbers on the pond's levees, and large numbers of gulls, herons, and other birds roost on the levees between Pond A12 and adjacent ponds. The amount and variety of bird use in Ponds A8 and A12 will be considered when developing project alternatives.

The salt marsh harvest mouse has had a limited presence in Alviso Ponds A8 and A12, based on data from trapping surveys. Trapping data show three capture locations in the vicinity of Ponds A8 and A12: two at the eastern edge of Pond A12 in New Chicago Marsh and one on the western edge of Pond A12 (Howard Shellhammer, Unpublished Data). Due to a lack of habitat within Alviso Slough near the Marina, salt marsh dependent species are not anticipated to occur in the proposed project area.

2A-4. Fish

Within the salt ponds themselves, fish community composition and species abundance are primarily a function of salinity, with higher-salinity ponds lacking fish altogether. The main fish species noted in Alviso Ponds are threespine sticklebacks in lower-salinity ponds, along with topsmelt and, more recently, longjaw mudsuckers in low-mid salinity ponds (Carpelan, 1957; Lonzarich and Smith, 1997).

Local fishermen have noted that more than 100 fish species have been recorded in the tidal waters of the South Bay (Laine, 2006). Many of these fish, including bat rays, leopard sharks, northern anchovies, gobies, and others, occur in sloughs, in tidal channels within marshes, and on mudflats inundated at high tide. These habitats represent highly productive foraging habitats for estuarine fishes in the South Bay (Harvey 1998).

Abundance of saltwater fish has declined in the southernmost part of Bay for decades, becoming particularly noticeable in the Alviso area in the 1970's (Laine, 2006). Although no commercial fishery for fin-fishes has existed in the Alviso area, this area has long been important for recreational fishing, particularly for sturgeon and striped bass when the Alviso Marina boat ramp was operational. Large sturgeon and striped bass are still caught in the South Bay, but public boating access is limited, with boat launches at the entrance to Refuge headquarters in Newark and in the Redwood City area. There are also a few boats moored along Alviso Slough.

Surveys of South Bay tidal sloughs in June and September 2004 (U.S. Geological Survey Unpublished Preliminary Data relating to the South Bay Salt Ponds Project) detected a total of 10 fish species. Northern anchovies and topsmelt were by far the most abundant species caught; the American shad, bat ray, leopard shark, striped bass, staghorn sculpin, shiner surfperch, green sturgeon, and yellowfin goby were also noted. Grass shrimp and Spanish mackerel have also been observed (Laine, 2006). Anadromous salmonids, such as steelhead, a Federal threatened species, and Chinook Salmon, a Federal and California species of concern, migrate through Alviso Slough.

2B. WATER AND SEDIMENT QUALITY, INCLUDING HAZARDOUS MATERIALS

Water flowing in a creek or river picks up and carries fine grains of soil, rock or mineral called sediment. When the flowing water slows down or reaches a wide or flat area, the sediment "drops out" and is deposited into the stream bed. This can clog the creek, reducing the amount of water it can transport. Sediment also fills the underwater spaces around rocks, fallen tree trunks and branches, eliminating places where fish and other species seek food and shelter.

Earth Tech, Inc. (Earth Tech) was retained by the District to perform a Phase I Hazardous Susbstance Liability Assessment (HSLA) along the banks of the Alviso Slough. The report noted some potential sources of water and sediment quality hazards, including abandoned boats and materials at the South Bay Yacht Club, historical dumping along the Pond A8 levee, and mercury-contaminated sediments in the Slough.

The sediments of Alviso Slough potentially contain elevated levels of mercury resulting from ongoing mercury loads originating in the upper Guadalupe River watershed mining district. A preliminary estimate of movement of mercury in the Guadalupe River Watershed was conducted as part of the Guadalupe River TMDL Project (SCVWD, 2006). Those estimates have been refined by more recent monitoring using stream cross sectional sampling and continuous monitoring of total suspended solids (TSS) (Mckee et al., 2006), which verifies that the water quality objective established by the San Francisco Bay Regional Water Quality Control Board of 25 nanograms per liter (ng/L) is routinely exceeded due to the presence of mercury-laden sediments originating in the upper watershed. The Guadalupe River watershed will continue to deposit mercury-contaminated sediments in Alviso Slough, although the concentration of mercury in deposited sediments may be attenuated over time as remedial actions and other stream stewardship activities in the upper watershed progress.

Using historical daily streamflow data from 1950 to 2001 obtained from the USGS, and using the sediment-flow rate relationship calculated for Guadalupe River (Northwest Hydraulic Consultants (NHC)), daily suspended sediment and bed load transported by the river over this period was calculated. An estimate of mercury concentration on particles (both suspended sediment and bed load) of 0.8 mg/kg (Thomas and others 2002) was used to calculate the daily mercury load transported downstream at the USGS gauge station at St Johns Street.
The estimated bed load of mercury ranges from 300 grams per year (g/year) to 66,000 g/year, while the estimated suspended sediment load of mercury ranged from 1,600 to 890,000 g/year. Winter flows deliver most of the total mercury load (Mckee et al., 2006).

Sediments in the Alviso pond complex generally have elevated ambient mercury levels. Ponds that were historically under the influence of the Alviso Slough, the discharge point for the Guadalupe River, appear to have elevated mercury levels in sediment that are on average two to five times the ambient level. The highest mercury concentrations, as well as the highest level of spatial variability within the ponds, are in Ponds A7, A8, A12, and A13. Peak concentrations of mercury in individual samples were 3.2 and 4.4 parts per million (ppm) in Pond A8, 4.5 ppm in Pond A12, and 3.1 ppm in Pond A13. Sediment mercury concentrations in the lower Guadalupe River range from 1 to 10 ppm, with a median of 2.5 ppm. Alviso Slough concentrations range up to 1.1 ppm, with a median of 0.8 ppm (Maurer and Adelsbach 2002).

The concentrations of other metals detected in the Alviso ponds sediment samples were found to be within the general range of ambient concentrations found in the surrounding area, including the Guadalupe River (U.S. Fish and Wildlife Service and California Department of Fish and Game 2003).

Alviso Slough actively exchanges water with the South San Francisco Bay due to tidal motions and as a result salinity is highly variable in Alviso Slough. Salinity levels at the mouth of Alviso Slough are similar to salinity levels at the Dumbarton Bridge.

2C. HYDROLOGY

The Guadalupe River formerly flowed northwest, through what is now Pond A8, and entered the Bay via Guadalupe Slough. With the creation of the salt ponds, and in conjunction with early flood control solutions, the Guadalupe River was diverted into Alviso Slough.

The Lower Guadalupe River is channelized from I-880 downstream to the San Francisco Bay. During dry conditions, Alviso Slough is characterized by calm, low-flow discharges with deposition of fine-grain sediment along the channel bed and adjacent marshplain. Changes to the slough size and marsh extent over the past several decades reflect the history of diking associated with construction of the salt ponds, the legacy of subsidence, past dredging practices and the high supply of sediment in the far South Bay.

Recent surveys conducted along Alviso Slough indicate that the sedimentation is continuing, with most of the changes occurring along the shoulders of the channel. Future changes in slough geometry will reflect these past conditions, the relative balance between erosive and depositional processes, and actions taken as part of a developed project.

The Guadalupe River formerly flowed northwest, through what is now Pond A8, and entered the Bay through Guadalupe Slough. With the creation of the salt ponds, and in conjunction with early flood control solutions, the Guadalupe River was diverted into Alviso Slough.

The Guadalupe River, the second largest tributary to South San Francisco Bay in terms of drainage area and flow, discharges to Alviso Slough. The bottom elevation of Alviso Slough ranges from -1 to -3 m NGVD. The tidal range in Alviso Slough is particularly large with measured high water approximately a factor of 1.6 higher (relative to mean tide) than high water at the Golden Gate Bridge (NOAA, 2003). Given the combination of strong tides and shallow depths in Alviso Slough, it is clear that most of the volume present in Alviso Slough at high water drains to Coyote Creek (and subsequently South San Francisco Bay) during ebb tide. Therefore this slough, as well as Coyote Creek and Guadalupe Slough, actively exchanges water with South San Francisco Bay due to tidal motions (CDFG, 2003).

Modeling of Alviso Slough was conducted and summarized in a 2004 report by Schaaf & Wheeler (Schaaf & Wheeler 2004). The conceptual model was based on these factors:

- The size of stable slough channels in the system are set by how much water moves in and out with the tides (tidal prism).
- The amount of water moving in and out decreased drastically when the slough levees were constructed to dike off the salt ponds.
- The whole area subsided, causing levees to be built higher to protect Alviso. Subsidence further increased channel depth.

- There is a constant source of sediment from the bay, which has been filling the deep, sunken channels.
- Marsh plants grow at about the elevation of an average high tide (mean high water). Below that, there are only mudflats because the plants drown.
- After the deep, sunken channels fill with sediment and reach about the average high tide line, marsh plants start to replace mudflats.
- The plants then help catch more sediment, and accelerate the process of the channels filling in.
- As the channels fill in, less and less water moves in and out, and the channels continue to shrink.
- Increasing the amount of water that moves in and out of the channel can stop or reverse that process.

The 2004 report included cross sections of the channel as it appeared over time (See Figure 5). These model assumptions and drawings are being updated now to better quantify the relative roles of tidal and fluvial processes in shaping the channel. The updated assumptions and cross section graphics, if available, will be included in the Final version of his Problem Definition Report.

The Guadalupe River and the Coyote Creek River have been the focus of a series of flood control projects over the years, as described in Section 1.

2D. LAND USE AND RECREATION

Located at the very northern edge of San Jose, the community of Alviso is characterized by its small town atmosphere, rich history, bayside location (San Francisco Bay), marinas, wide open spaces, agricultural activities, and a mix of residential, commercial, and industrial uses. Alviso has its own distinct sense of place despite its close proximity to the suburban communities and high technology industrial parks of Silicon Valley (Alviso 2006).

Alviso was incorporated in 1852 and consolidated with the City of San Jose in 1968. The Alviso planning area includes all properties within the City of San Jose north of Route 237, between Coyote Creek and Guadalupe River. The entire planning area is roughly 10,730 acres. The focus of the Plan is the land located within the Urban Service Area (approximately 2,840 acres) which can be divided into two subareas: the "village" and the larger area (Alviso 2006).

The Alviso village area includes the historic western grid, the neighborhood grid, and the lands on both sides of North First Street from Liberty Street to the southern boundary of the George Mayne School. Existing land uses in the village include single-family residences, some duplexes, triplexes, and small apartment buildings, small grocery stores, restaurants, warehouses, and trucking operations. The village area also contains San Jose's only yacht club and associated harbor.

The remaining larger area includes the developable properties on both sides of Gold Street, both sides of North First Street south of the George Mayne School, the Nortech Parkway area, and the large expanses of land east of Wilson Way. Existing land uses include the Summerset Mobile home Park, research and development firms, Water Pollution Control Plant, landfills, and agricultural land.

Major land uses surrounding Alviso include the Alviso Marina County Park (County Marina), Don Edwards San Francisco Bay National Wildlife Refuge, and salt evaporation ponds.

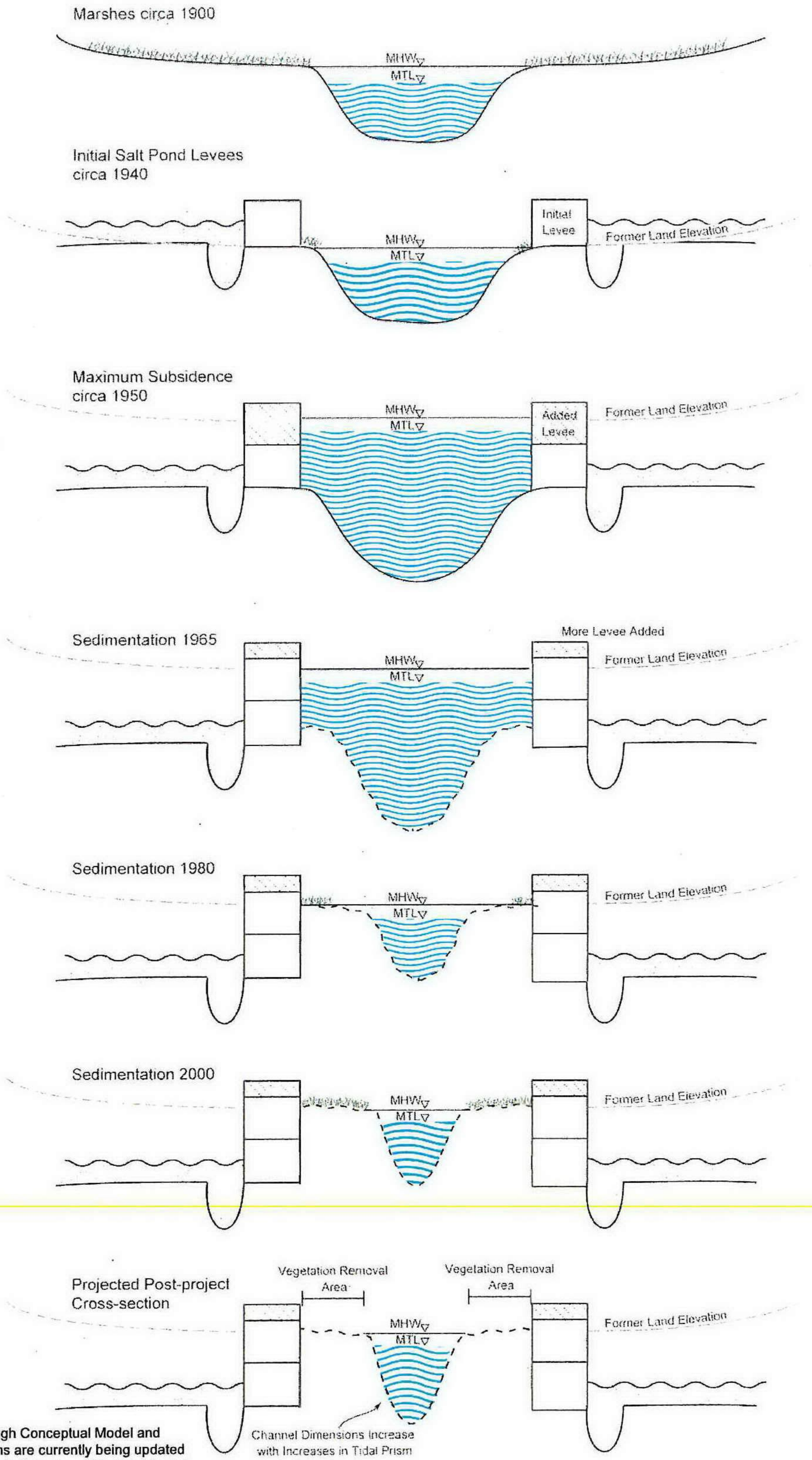
The 17-acre Alviso Marina County Park is owned and managed by Santa Clara County and accessible via Mill Street in Alviso. It provides opportunities for picnicking and bird watching, as well as access to other public lands for seasonal hiking and mountain bicycling. The Santa Clara County Parks and Recreation District (SCCPRD) closed the existing wooden floats and launch ramp in October 2003 due to deteriorating conditions of the floats and the overgrowth of wetlands vegetation that prohibited access to Alviso Slough. The flood gates at the Marina have not been maintained and do not operate. As part of the Alviso Marina County Park Master Plan implementation, a new launch ramp will be built with direct access into Alviso Slough. Other ongoing recreational improvements include a boardwalk loop trail through the marsh to Pond A12, parking lot reconfiguration, a new picnic area, and wildlife observation areas. It is anticipated that the design and permit processes for these improvements will be completed to begin construction in 2006.

Within the project area, Alviso Slough is generally owned by the California State Lands Commission (CSLC). Portions of the Alviso Pond complex are part of the Don Edwards San Francisco Bay National Wildlife Refuge, under management by USFWS since the 2002 purchase from Cargill. The USFWS manages its lands pursuant to the National Wildlife Refuge System Administration Act of 1966 and the Refuge Recreation Act of 1962 as well as other laws, Executive Orders, Regulations and Policies.

The Refuge Environmental Education Center is located in the Alviso pond complex, with access off Highway 237 and Zanker Road in Alviso. The building contains two classrooms, an auditorium, and an enclosed observation tower. A boardwalk winds through seasonal wetland habitat to provide viewing opportunities. The Environmental Education Center is open by reservation to school field trip groups and is generally open to the public on the weekends. The Refuge Headquarters and Visitor Center are located in Fremont outside of the project area.

Waterfowl hunting occurs at the refuge in certain areas. Additionally, the refuge is crisscrossed by a number of hiking trails. The Alviso Slough Trail forms a segment of the Bay Trail and is open to the public. An unimproved, on-street portion of the Bay Trail (no bike lanes or sidewalks) leads from the Alviso Marina and Historic District (adjacent to Alviso Ponds A8 and A12) south toward San Jose and Highway 237.

The Alviso Master Plan is incorporated into the San Jose 2020 General Plan as the Alviso Planned Community (City of San Jose 2006). The General Plan contains the major features of the Alviso Master Plan including a brief description of the overall intent, permitted land uses, and major policies. The Master Plan establishes the location, intensity and character of land uses; the circulation pattern and necessary infrastructure improvements to support development; the location and configuration of parks and community facilities within the area; and the implementation actions required to realize the Plan's objectives. The Alviso Master Plan also provides detailed policy direction, elaborating on the San Jose 2020 General Plan which is the principal document governing long term growth and development within the City.



Note: The Alviso Slough Conceptual Model and underlying assumptions are currently being updated to better quantify the relative roles of tidal and fluvial processes in shaping the channel.

Source: Schaaf & Wheeler, 2004

Figure 5. Alviso Slough Conceptual Model

The purpose of the Alviso Master Plan is to protect and enhance the small town quality of Alviso by guiding appropriate new development, community facilities, infrastructure, and beautification. By establishing specific goals, policies, and implementation measures, the Plan attempts to resolve the issues of zoning and General Plan inconsistencies, incompatible land uses, insufficient services and facilities, flooding, hazardous materials, vegetation and wildlife, soils and geology, cultural resources, truck traffic, air quality, noise from airplanes, economic development, and code enforcement. Specifically, the Alviso Master Plan provides for:

- The retention of the residential neighborhoods located within the village and the opportunity for some new medium to medium high density residential uses.
- A mix of residential, commercial, and public uses within the historic core of the village.
- The continuation and expansion of light industrial uses north of State Street.
- Opportunities for new industrial parks and combined industrial/commercial ventures near Highway 237.
- The retention of the Water Pollution Control Plant and its associated lands.
- The continuation of landfill and resource recovery (recycling activities north and east of the village.
- Opportunities for new community facilities, infrastructure improvements, and other community enhancements.
- An economic development strategy which includes implementation measures for strengthening existing businesses and providing opportunities for the new businesses in Alviso.
- An action plan for implementing the Alviso Master Plan.

The Alviso Master Plan realizes that the full build out of Alviso will take many years and that it may extend beyond the year 2020; however, it is important to set forth a vision now to avoid piecemeal development and to better respond to potential development pressure within the area.

The General Plan and zoning designations provide specific guidance for allowable and future land uses. The General Plan designations (February 2006) for land uses adjacent to Alviso Slough include Public Open Space, Private Open Space, and Mixed Use (Commercial, Housing, Civic). The zoning designation (July 2006) for land uses along the Alviso Slough in the Project Area is CP (Commercial Pedestrian). There is a Historic District overlay over the majority of the Project Area.

Additional plans and policies guiding planning and recreation in this area include City of San Jose Bicycle Master Plan, the San Francisco Bay Trail Plan, and the Santa Clara County 1997 Alviso Marina County Park Master Plan.

2E. TRANSPORTATION

Alviso is readily accessed from SR 237, which operates at a Level of Service (LOS) rating D, indicating that this roadway can be somewhat congested but without excessive delays. Caltrans has the primary responsibility for SR 237.

2F. HISTORIC AND CULTURAL RESOURCES

Historic records indicate that the first official town survey was conducted in 1849. Its location in South Bay provided a prime opportunity to become one of the oldest ports on the west coast of the United States. It was a busy and prosperous port, shipping agricultural products from the Santa Clara Valley and mercury from the New Almaden mines. In 1864, the completion of the railroad from San Jose to San Francisco caused the decline of the commercial use of the port. The 154-year old town is listed as a Historic District in the National Register of Historic Places (NRHP). It is located on the east side of the slough and generally encompasses the downtown area, between Mill Street on the northern end and Moffat Street at the southern end. Specific historic structures include the Bayside Canning Company building complex, the South Bay Yacht Club, Wade's Warehouse, and the Old Union warehouse and docks. The World War II era shipyard is not considered eligible for listing on the NRHP, and an eligibility evaluation has not been performed for the UPPR bridge (SCVWD 2002). Impacts to the resources listed on the NRHP, either physically or visually, could constitute a significant impact.

2G. PUBLIC UTILITIES

Public utilities in the area include a potable water pipeline that runs parallel to SR 237, several storm drain outfalls, a sanitary sewer line along Gold Street bridge, and several overhead electrical wires near the Gold Street bridge (SCVWD 2002). The Union Pacific Railroad (UPPR) operates an active rail line in the area. The railroad crosses bridges on Coyote Creek and Mud Slough.

2H. AESTHETICS

The marsh habitats in this area are suitable habitat for a variety of plants, birds, and other wildlife, which lend to the quality of the aesthetics in this area. Improved recreational features could significantly enhance the aesthetic quality for local residents as well as recreation enthusiasts.

2I. PUBLIC HEALTH

Tidal marshes in the South Bay are not a major source of mosquito breeding habitat. However, the AWTF has noted that there is some degree of nuisance from mosquitoes that breed in open ditches that still exist within the community. (Laine, 2006; Rivera, 2006).

2J. ECONOMIC/SOCIAL CONDITIONS, INCLUDING ENVIRONMENTAL JUSTICE

The environmental documents to be prepared for the Alviso Restoration project will evaluate the current social and economic conditions and will identify environmental justice considerations. This should include interviews with local land use agencies having jurisdiction in Alviso, as well as interviews with community members/leaders to identify those social and economic conditions that cannot be understood through purely statistical research.

The United States Environmental Protection Agency defines Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. On Feb 11, 1994, President Bill Clinton signed Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities.

3. PROBLEM DEFINITION

Between 2002 and 2004 the District implemented one-percent (100-year) flood protection measures in the Guadalupe River from I-280 to I-880 in San Jose (Downtown Guadalupe river Flood Protection Project) and from I-880 to the County Marina in Alviso (Lower Guadalupe River Flood Protection Project). The project work included a combination of floodwalls, levees and channel improvements. Along Alviso Slough between the Gold Street Bridge and the County Marina, one-percent flood protection work consisted of raising existing levees and constructing an overflow weir at an existing low point in the levee to facilitate the diversion of high flows to the adjacent former salt pond complex (Ponds A8-A7-A5-A6). Vegetation removal was performed only in the uppermost section of this reach, near the Gold Street Bridge, to facilitate flows over the weir as part of this flood protection project. The project area continues to be subject to tidal flooding. Flood risk continues to be a major concern of the community.

The reach of Alviso Slough downstream of the Gold Street Bridge has experienced a gradual decline in channel width and increasing encroachment from vegetation over many years. These conditions have come about after over a century of human activities such as groundwater over-pumping, the manipulation of the South Bay marshlands and drainage channels for agricultural and salt-making purposes, the realignment of channel meanders for more efficient flow conveyance, and urban development in the watershed. These anthropogenic influences, combined with natural processes attempting to achieve a level of equilibrium, have resulted in a reduced channel width and depth that precludes the community's ability to use the slough, as it once did, for navigational and recreational access.

For many years, the community of Alviso has requested that the slough be restored to previous conditions where both the width and depth were greater than today's conditions. In November 2002, District staff presented, for the Board of Directors' consideration, enhancement opportunities for the Lower Guadalupe River flood protection work. One of these enhancements was to remove sediment and vegetation from Alviso Slough as a restoration project. After Board direction to further evaluate these enhancements, staff returned a series of recommendations to the Board of Directors in January 2004. At the January 20, 2004 Board meeting, many members of the community and the public presented their interests and strong support for slough restoration that would both remove vegetation and restore salinity levels to historic conditions. The speakers enumerated the benefits of such actions for the community, including improved navigation, boating, recreational access, and habitat improvements. The Board approved a motion directing staff "to prepare a project that includes the following: Phase I, removal of 7 acres of vegetation and root mass to a depth of 4 feet on both banks of the Alviso Slough from the Gold Street bridge to the County Marina, and then in the following year a long term project related to bringing in salt water."

Removing the vegetation and root mass in accordance with the Board motion would create more open waters, enhance the natural aesthetics, and incidentally improve recreation access from the shores. It would allow the community of Alviso to return to historic use of the slough. Concurrent with this effort, the first phase of the South Bay Salt Pond Restoration Project, led by a consortium of agencies (California Coastal Conservancy, U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers, CA Dept. of Fish & Game) is underway. One first phase action would include a muted tidal connection at Pond A8 adjacent to Alviso Slough. This project would increase the tidal prism through the slough, scour the channel to a greater width and depth, and would tend to increase salinity levels.

Opportunities and constraints associated with this project are included in section 5. These were identified after conducting the preliminary background research summarized in section 2.

4. COMMUNITY OUTREACH

One of the most important aspects of the planning process is the identification and participation of the interested parties within or near the Alviso Community and greater San Francisco Bay area. Interested parties include individuals, agencies, and organizations which may affect or be affected by the Alviso Slough Restoration Project. In other words, they have a vested interest in the goals, activities, implementation and outcomes of the project. The success of the project depends on the input of these identified parties. Involving interested parties:

- Facilitates better decisions and better implementation of decisions;
- Facilitates their buy-in and support for the program;
- Allows interested parties greater ownership of the program;
- Guards against the program becoming too inwardly focused and aids decentralized decision making; and
- Helps to identify issues not addressed by the project staff.

Public input will be sought at key times during the project, such as during identification of project alternatives, identification of key issues, and after distribution of the draft environmental reports (CEQA and NEPA documents). The CEQA/NEPA processes are a key mechanism for public input into defining the project and the consideration of effects. Key steps in the processes include public scoping to identify alternatives, public review of the draft environmental documents, and public comment on the findings related to the project to be put forward by the District.

A preliminary list of parties who may be interested in participating in the public process for this project is included below. Additional parties will be solicited by public notices.

- Alviso and Lower Guadalupe Collaborative (ALGC)
- Alviso Marina (County Parks)
- Alviso Residents
- Alviso Water Task Force (AWTF)
- Association of Bay Area Governments (ABAG)
- Audubon Society
- CALFED
- California Coastal Conservancy

- California Department of Fish and Game (CDFG)
- California Native Plant Society (CNPS)
- California Sport-fishing Alliance
- California State Lands Commission (CSLC)
- City of San Jose
- Communities for a Better Environment
- Don Edwards San Francisco Bay National Wildlife Refuge (USFWS)
- Ducks Unlimited
- Environmental Defense Fund
- Friends of the San Francisco Estuary
- Greater Guadalupe Resource Conservation District
- Greenbelt Alliance
- Guadalupe Adaptive Management Team
- Mid-Peninsula Regional Open Space District
- Natural Heritage Institute
- Natural Resources Defense Council (NRDC)
- NOAA Fisheries
- Pacific Coast Federation of Fisherman's Association
- Pacific Gas & Electric (PG&E) and other local utilities
- Regional Water Quality Control Board (RWQCB)
- San Francisco Bay Bird Observatory
- San Francisco Bay Conservation and Development Commission (BCDC)
- San Francisco Bay Joint Venture Program
- San Francisco Estuary Institute (SFEI)
- Santa Clara Valley Open Space Authority
- Santa Clara Valley Water District (SCVWD)
- Save the Bay Association
- Sierra Club
- State of California, Division of Boating and Waterways
- South County Streams for Tomorrow (Keith Anderson)
- The Bay Institute of San Francisco
- Trout Unlimited
- Union Pacific Railroad
- United States Army Cops of Engineers (USACE)
- United States Environmental Protection Agency (USEPA)
- United States Fish and Wildlife Service (USFWS)
- Waterkeepers
- Western Waters Canoe Club

5. OPPORTUNITIES AND CONSTRAINTS

For purposes of this report, an opportunity is defined as either 1) a specific benefit that can be directly achieved through implementation of the project; or 2) a potential enhancement or other planned or future project by other entities in the area that contribute to the overall community interests. A constraint is defined as factor that may limit the selection of project alternatives or that may limit the extent to which the project objectives can be met. The initial opportunities and constraints identified below influence the ability to achieve target objectives and may drive design parameters. Based on a preliminary review of data and conditions, the following assumptions, opportunities and constraints were identified.

5A. ASSUMPTIONS

Because a specific project action has not been selected, a basic set of assumptions was needed to help focus the range of possible opportunities and constraints for the project.

The following assumptions are identified for the Alviso Slough Restoration project:

- Both CEQA (EIR) and NEPA (EA or EIS) documentation are required.
- A "no project" alternative would be strongly opposed by the Alviso Community as a short- or long-term solution.
- There are data (from existing reports and studies currently underway) available from the SBSP Restoration Project, the Lower Guadalupe River Flood Protection Project, the South San Francisco Bay Shoreline Study (Shoreline Study), and the City of San Jose South Bay Marshes mapping project; some of which will be directly applicable to the Alviso project.
- Permits or other authorizations will be required from the San Francisco Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers (USACE), The San Francisco Bay Regional Water Quality Control Board (RWQCB), NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA), California Department of Fish and Game (CDFG), and the California State Lands Commission (CSLC).

To a large degree, the project definition, purpose, need, and the extent of proposed activities will determine the specific type of approval requested from the various resource agencies (see Table 1). The range of discretionary approvals that are anticipated to implement the proposed project activities depend, for example, on whether an alternative is identified that removes vegetation with little sediment, or an alternative that dredges more deeply is identified, or another yet to be developed alternative. The CEQA/NEPA review processes that will identify the environmental effects of each alternative will be important in the selection of which alternative is out forward as the preferred project. Once the landscape-scale approach is more clearly defined, the required permitting approvals and remaining constraints to restoration can be fully analyzed, prioritized, and developed in site-specific alternatives.

Table 1. Anticipated Regulatory Requirements

Agency/Permit	Overview of Permit/Consultation	Anticipated Process, Timeframe, and Issues
BCDC – *Administrative or Major Permit*	The San Francisco Bay Conservation and Development Commission's (BCDC) main goals are to prevent unnecessary filling of the Bay, promote appropriate water-oriented shoreline development, protect Suisun Marsh, and provide maximum public access to the Bay. Any person proposing to fill, extract materials, or change the use of water, land, or structures in or around San Francisco Bay must first obtain a permit from the San Francisco BCDC. An administrative permit can be issued for an	Dredging an existing harbor (*i.e.*, the South Bay Yacht Club) for recreational enhancement or navigation is a water dependent activity (per the USACE), and one that is consistent with BCDC policies for encouraged uses of the Bay. Therefore, the permit process is typically much simpler than one that involves fill of jurisdictional waters.

Table 1. Anticipated Regulatory Requirements

Agency/Permit	Overview of Permit/Consultation	Anticipated Process, Timeframe, and Issues
	activity that qualifies as a minor repair or improvement in a relatively short period of time and without a public hearing on the application. A major permit is issued for work that is more extensive than a minor repair or improvement. A public hearing is held on an application for a major permit and the application may be reviewed at hearings held by the engineers and designers who advise the Commission.	
USACE – *Section 404 Nationwide or Individual Permit or Consolidated Dredging Permit from the Corps*	Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. The USEPA has enforcement and veto powers under the Clean Water Act.	Submit notification to USACE if activities will take place within Waters of the U.S. and wetlands. The USACE would view either dredging or mowing in a similar manner in that they would both result in incidental fill into their jurisdiction, and would therefore require a 404 permit. To the extent practicable, excavation equipment shall work from upland sites otherwise an explanation of the need to place excavation equipment in the waters of the U.S. is needed. Removal of wetland vegetation in a manner that may add fill requires submittal of type and area of removal. Drawings to be submitted to USACE. Depending upon the level of impact (permanent, temporary, direct, indirect) the proposed activities may be covered by one of the permits listed here. Specifically which permit applies depends upon the proposed work and generally on the area of impact. Another determinant in dredging operations is the use of the dredged materials and location of disposal. A lesser impact can be approved via a Nationwide Permit and the process can take between 2 and 5 months. If the project has impacts that exceed these thresholds, then activities can only be permitted under an Individual Permit with associated

Table 1. Anticipated Regulatory Requirements

Agency/Permit	Overview of Permit/Consultation	Anticipated Process, Timeframe, and Issues
		404(b)(1) Alternatives Analysis. The USACE or USEPA can require an Individual Permit at its own discretion. This process also involves circulation of a Public Notice and the permit timing generally is between 6 months and a year. Alternatively, the work could be permitted under a Consolidated Dredging Permit, if the dredged material is to be disposed in the Bay or open ocean; this application is more along the lines of a multi-agency approval as it is accepted for Section 404/10 dredging authorizations, for an Administrative BCDC dredging authorization, and WDR from the RWQCB (see below).
USACE – *Section 10 Navigable Waterways permit*	Section 10 (33 U.S.C. 403) of the Rivers and Harbors Act covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition, or capacity of those waters.	The decision whether to grant or deny a permit is based on a public interest review of the probable impact of the proposed activity and its intended use.
RWQCB – *Section 401 Water Quality Certification and/or Waste Discharge Requirement (WDR) from the SFBRWQCB*	Under federal Clean Water Act (CWA) Section 401, every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification (Certification) that the proposed activity will comply with state water quality standards. Most Certifications are issued in connection with U.S. Army Corps of Engineers (Corps) CWA Section 404 permits for dredge and fill discharges or Section 10 permits. The RWQCB may elect to permit the proposed activities via Waste Discharge Requirement (WDR) under the Porter Cologne Water Quality Control Act.	Discharges to water bodies must comply with water quality standards. The permit application materials and processing for the Section 401 and WDR at the RWQCB are essentially identical. Generally, as part of the permit application materials some rather extensive dredging materials testing and water quality effects analysis need to be conducted. Mercury contamination in the area will increase complexity of Waste Discharge Requirement. The District has an existing WDR – Order R2-2002-0028 (Order) that applies to routine stream maintenance activities including sediment removal, vegetation

Table 1. Anticipated Regulatory Requirements

Agency/Permit	Overview of Permit/Consultation	Anticipated Process, Timeframe, and Issues
		management, and other activities within streams. The project area is not included in the geographic scope of the Order.
USFWS – *Letter of Concurrence for No Effect or Biological Assessment*	USFWS evaluates impacts on fish and wildlife of all Federally permitted projects, including projects subject to the requirements of Section 404 and Section 10.	An early assessment of the potential effects of the project on federally-listed species concluded that the proposed activities would not impact the salt marsh harvest mouse or California Clapper Rail or any federally listed species. One of the primary tasks of the project team is to compile a technical report (that may take the form of a full Biological Assessment) regarding project activities and their impacts on special status species. This report is forwarded to the federal lead permitting agency and they require an independent assessment under Section 7 of the Federal Endangered Species Act of whether to gain concurrence from the USFWS on the project effects. If a Letter of Concurrence is sought, it generally takes 12 months to obtain.
CDFG – *Trustee Agency reviewer for CEQA* – *Incidental Take Permit (ESA)*	The Department, as the trustee agency for fish and wildlife resources, will provide the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities and shall make recommendations regarding those resources held in trust for the people of California. Section 2080 of the Fish and Game Code prohibits "take" of any species that the commission determines to be an endangered species or a threatened species. California Endangered Species Act allows for take incidental to otherwise lawful development projects.	The project is not anticipated to have any effect on state, fully-protected species. The technical report documenting the distribution of the species within the vicinity of the work area and the potential project-related effects on the species would be the basis for gaining concurrence from the Department on these issues. This step generally takes 6 months.
NOAA Fisheries – *Letter of Concurrence for No Effect from NOAA Fisheries or Biological Assessment*	NOAA Fisheries reviews projects under the Magnuson Fishery Conservation and Management Act, the Fish and Wildlife Coordination Act and many other acts. In the case of the San Francisco Bay Area, a project that takes place in an area where salmon or other endangered fish spawn would require review.	A Biological Assessment may need to be prepared for NOAA Fisheries describing the proposed project improvements and the potential affects on federally-listed anadromous fishes. The process of obtaining concurrence from this agency generally takes 6 months.

Table 1. Anticipated Regulatory Requirements

Agency/Permit	Overview of Permit/Consultation	Anticipated Process, Timeframe, and Issues
USEPA – *Consulting agency to the Corps of Engineers*	USEPA is a consulting agency to the Corps of Engineers in reviewing permit applications (particularly in regard to ensuring compliance with the National Environmental Policy Act) and oversees the regulatory activities of the Army Corps of Engineers on a programmatic level.	The USEPA has oversight authority as described in the Permit Overview column. The USEPA is often consulted on District projects and will be invited to participate. They are not anticipated to be heavily involved in this project given the proposed work and level of impacts.
CSLC – *Trustee Agency reviewer for CEQA*	The State Lands Commission has jurisdiction and management control over the state's sovereign lands, including all ungranted tidelands and submerged lands, beds of navigable rivers, streams, lakes, bays, estuaries, inlets and straits.	Consultation is required.
SHPO – *Section 106 review*	Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of proposed federal undertakings on historic properties. NHPA requires federal agencies (and their designees, permitees, licensees, or grantees) to initiate consultation with the State Historic Preservation Officer (SHPO) as part of the Section 106 review process.	District will identify all historic resources as defined by the National Historic Preservation Act, Section 106. SHPO has 30 days to respond to a request for review.

A possible approach to permit acquisition is the Joint Aquatic Resource Permit Application (JARPA). A JARPA may be used to apply for a variety of projects that take place along the San Francisco Bay and the coastline, including projects near or in wetlands or creeks that flow to the bay. The single JARPA document is designed to replace individual applications for state, regional and national agencies; and, therefore, to make the application process more clear and consistent. As described in the Permit Overview Column, the intent of this application is to cover all permit agencies with a single application. The time required for processing generally takes 9 months.

A preliminary review has identified the following projects for consideration in the cumulative impacts analysis; this is important as there may be opportunities and/or constrains associated with these current or near-future projects:

i. South Bay Salt Ponds Restoration Project
ii. Lower Guadalupe River Flood Protection Project
iii. Upper Guadalupe River Flood Protection Project
iv. City of San Jose Lower Guadalupe River Trail Project and other City efforts
v. Alviso Marina project, phase 2
vi. South Baylands Mercury Project
vii. South San Francisco Bay Shoreline Study

Local agencies and utilities will be contacted to identify other possible future projects, including:

- i. San Francisco Bay Conservation and Development Commission
- ii. Mid-Peninsula Regional Open Space District
- iii. City of San Jose (Public Works; Parks and Recreation; Planning)
- iv. Santa Clara County (Public Works; Parks and Recreation; Planning)
- v. Don Edwards San Francisco Bay National Wildlife Refuge (USFWS)
- vi. Pacific Gas & Electric Company and other local utilities
- vii. Union Pacific Railroad (UPPR)

A query of the CEQAnet database did not result in the identification of other specific projects in this area; a query should be performed again during the planning phase.

5B. OPPORTUNITIES

An opportunity is defined as either 1) a specific benefit that can be directly achieved through implementation of the project; or 2) a potential enhancement or other planned or future project by other entities in the area that contributes to the overall community interests. Some opportunities are highly specific to activities within Alviso Slough, while others, while still associated with the Slough, contribute to goals and objectives of the Alviso community on a larger scale.

The following potential opportunities are identified related to the project:

- i. Restoration of marsh habitat to previous conditions (i.e., creating marsh and associated tidal, sub-tidal and fluvial habitat suitable for multiple uses including navigation, recreation, fisheries, and wildlife).
- ii. Enhance recreation opportunities at and surrounding the Alviso Slough:
  - Fishing and hunting
  - Wildlife viewing (bird watching, etc.)
  - Environmental education
  - Trails for walking, jogging, hiking, and cycling
  - Recreational and commercial boating (motorized and non-motorized)
  - Improved public access to baylands including Americans with Disabilities Act requirements
- iii. Maintain flood protection for Alviso
- iv. Use of the Alviso Bay Trail access as a means to attract visitors to explore additional areas in historic Alviso through the use of self-guided history tours and the development of a visitor's center, possibly near the old Cannery building.
- v. Enhance the potential for re-use of the historic Cannery building or at least interpretation of this site and its connection to the Bay and Alviso.
- vi. Improve the opportunity for the future development of a marina by other entities near or along Alviso Slough that could include public waterfront access and related enhancements. Such a marina project could be coordinated to connect with the City of San Jose's plan to build a pedestrian bridge over Alviso Slough to join the "Legacy" property to the south (new Bay Trail spine alignment).
- vii. Help integrate plans for specific trail proposals within the community of Alviso as a way of enhancing visitor use of the area.
- viii. Integrate interpretation and education into the restoration plan for Alviso Slough and ongoing planning for the SBSP Restoration Project.
- ix. Provide additional local connector trails between the waterfront and the community of Alviso to augment the Bay Trail spine and City of San Jose alignments.

x. Restoration of Pond A8 to tidal habitat may contribute to the long-term goals and objectives of the SBSP Restoration Project, with potential benefits for small craft boating (recreation) along Alviso Slough.
xi. The USACE has a Programmatic Agreement for Lower Guadalupe for Section 106 requirements regarding protection of cultural resources; coordination with the South Bay Salt Ponds project team regarding the Section 106 consultation may result in time savings (verification of the Agreement is underway).
xii. Enhanced aesthetics
xiii. Reduced mosquito nuisance
xiv. Potential to enhance wildlife and fisheries habitat
xv. Potential to Improve sediment quality in Alviso Slough through removal or remediation

5C. CONSTRAINTS

A constraint is defined as factor that may limit the selection of project alternatives or that may limit the extent to which the project objectives can be met. The following constraints are identified for the project:

i. The existing wetlands may be viewed as high value native marsh that should not be impacted without a valid, water dependent project purpose.
ii. Mitigation and/or maintenance requirements may be expensive, time consuming, or land intensive.
iii. Regulatory agencies may require special consideration of invasive plant species and native plant species during the permitting and mitigation.
iv. Existing infrastructure (bridges, utilities, active railroad, levees along the right bank of the slough, buried concrete slab at the Old Union Warehouse [Gross Building]).
v. Possible buried rubble in slough from former landfill and dumpsite in vicinity of Pond A8; possible sunken boats in slough; abandoned boats and materials in vegetation at South Bay Yacht Club
vi. The presence of Special Status species may require additional agency consultation, field studies, and/or expensive mitigation, or could impede permit acquisition.
vii. Right-of-way issues, such as access or easement restrictions
viii. The project will attempt to minimize impacts and will mitigate for all significant environmental impacts.
ix. Possible limited staff and budget of managing agencies.
x. Mercury and other contaminants present in sediments of Alviso Slough and Guadalupe River in the project location.
xi. The SBSP Project has not yet finalized all of the project alternatives for Pond A8. The restoration of Pond A8 as part of the SBSP Project may not create the conditions conducive to naturally trigger the restoration of the Alviso Slough, or it could take many years. Additionally, the breaches to Pond A8 could be closed (i.e., Alviso Slough connections removed) based on results of the studies.

xii. Pond A8 currently provides flood overflow storage and conveyance of Guadalupe River/Alviso Slough flows via the overflow weir along Alviso Slough. Phase 1 of the SBSP Project is an opening of Pond A8, in reversible fashion, so as to allow for data collection, monitoring, and analysis. Since SBSP Phase 1 actions must not worsen current levels of flood protection, the existing flood storage function of Pond A8 may limit the amount of tidal scour along Alviso Slough. The Phase 1 breach may be closed during the wet months depending on operational considerations. Seasonal management would continue until channel scour and associated increases in conveyance completely offset loss of flood storage.

xiii. Seasonal management of Phase 1 actions at Pond A8 may slow or limit the amount of channel scour along Alviso Slough until year-around operations could be implemented.

xiv. The South Baylands Mercury Study, as part of Phase I of the SBSP Project, is to take place over 3 years, and the data may not be complete in time for use in the Alviso Slough Planning Study.

xv. Permitting requirements (see Table 1).

6. POTENTIAL CHANGES TO PROJECT OBJECTIVES AND SCOPE

The initial objectives defined in the Project Plan (see section 1) were analyzed based on data gathered on the current environmental, social, and regulatory conditions. The project objectives will be discussed as part of consultations with resource agencies. Compatibility with project objectives is one of the criteria for selecting a reasonable range of project alternatives. Therefore, the objectives should be written so that the planning study team can review a range of alternatives that could accomplish all or some of the desired results. Clear project objectives simplify the alternative selection process by providing a standard against which to measure possible alternatives. Both CEQA and NEPA require a project alternative analysis, including comparisons to a no action or no project alternative. Table 2 below presents the refined project objectives.

An important factor to the successful implementation of these objectives may be the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River. Because the timing of the Alviso Slough project is proposed to be much shorter than the Salt Pond Restoration Program, identifying a short term solution that can later feed into a larger or longer-term solution could be the most efficient and satisfactory solution overall, even if some of the Alviso Slough project objectives are not fully met in the short term.

As shown in Table 2, Project Objective No. 1 has been refined to reflect the broader goal of restoring channel width and habitat. It may turn out that removing more or less than the 7 acres of vegetation originally identified may be necessary to implement the project. In this case, the Refined Project Objective serves as a true "objective" in that the project is not artificially constrained by a number that may or may not make sense once the analysis is complete.

Table 2. Refined Project Objectives

Original Objective (2004 Project Plan)	Rationale for Modification	Proposed Refined Project Objective
1. Remove 7 acres of vegetation and root mass to a depth of 4 feet between the Gold Street Bridge and County Marina.	The objective should state the desired outcome, not the proposed action. While the action as stated at left may be the desired or proposed project, the objective should be stated so as to allow other alternatives that could accomplish the same underlying goal. Recommendation: Combine and modify original objectives #1, #2, and #7.	Restore Alviso Slough's channel width and habitat to prior to 1983 conditions. [Note : Removal of 7 acres of vegetation and root mass to a depth of 4 feet between the Gold Street Bridge and County Marina could be one method of achieving this objective]
2. Restore the slough's open water channel width to prior to 1983 conditions.	See #1	---
3. Improve navigation so the community can expand on boating and other recreational opportunities.	Expanding recreational opportunities can also be accomplished with better access and aesthetics. Also relates to tourism, which the AWTF would like to promote. Recommendation: Modify and combine with #4.	Improve the community's ability to pursue navigation, access, and aesthetics to encourage the expansion of boating and other recreational and/or tourism opportunities.
4. Restore historic public access and aesthetics for the Alviso community.	The access and aesthetics issues relate to persons beyond those within the Alviso community, and the reference to historic conditions is vague. Recommendation: Modify and combine with #3.	---
5. Maintain one-percent flood protection in Alviso Slough.	No change.	Maintain one-percent flood protection in Alviso Slough.
6. Reduce mosquito nuisance.	No change.	Reduce mosquito nuisance.
7. Expand open water habitat and inundated mudflat habitat of the slough.	See #1	---
8. Promote the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.	Add specific reference to the Pond A8 Applied Study.	Promote the integration with the Salt Pond Restoration Program (including the Pond A8 Applied Study) to bring salt water connections to the Lower Guadalupe River.

7. NEXT STEPS

The next step of the planning study is to develop alternatives and analyze their ability to meet project objectives, as well as to identify specific studies that should be completed to develop or fully evaluate the alternatives. The following are the proposed approaches and studies to support the alternative analyses.

7A. ALTERNATIVES DEVELOPMENT

Develop Screening Criteria for Conceptual Alternatives

Screening criteria will be used to determine whether a conceptual alternative would qualify as a feasible alternative. Public participants will be involved in developing and/or reviewing these criteria. The final screening criteria will be finalized later in the project and preliminarily may include:

i. Achieves project objectives
ii. Features environmental enhancement measures
iii. Environmental and regulatory opportunities and constraints are met
iv. Permitting and implementation timelines appear feasible
v. Estimates of capital, operational, maintenance, mitigation, and monitoring costs
vi. Long term management of the channel profile can be achieved

Preliminary Alternatives

CEQA and NEPA require an analysis of a range of reasonable alternatives to the project, including a No Action alternative. The proposed project alternatives will be developed in accordance with the Revised Project Objectives (in section 6). The alternatives should be feasible, practicable, and attain all or most of the basic objectives of the project. Under the No Action alternative, there would be no project implemented. Other project alternatives will be assessed and compared against project objectives, existing conditions, and environmental and regulatory constraints. These alternatives may include different restoration methodology, timeframe, extent, or include other project as defined by community or public input. They will be developed using the screening criteria outlined above[1].

7B. RECOMMENDED STUDIES AND ACTIONS

Based on review of existing data and information, review of the project objectives, and input from the AWTF, the following studies and actions will be used to support the conceptual and feasible alternative analyses:

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[1] The "Agency Preferred Project Alternative" and "Environmentally Preferred Alternative" will be identified among the feasible alternatives.

Community Planning Strategy and Cost/Benefit Analysis

In addition to the purpose of restoring the slough's channel width and habitat, an incidental benefit of the project is to support community development of Alviso by supporting land use and water planning consistent with the City of San Jose Alviso Master Plan and applicable Specific Plans. The project would achieve this benefit through the restoration of navigational capabilities, recreation, access, and fisheries in Alviso Slough.

To this end, this project will include a qualitative cost/benefit analysis of each alternative to assess the preferred project alternative and the best course of action for project implementation from a community development perspective. This will include an analysis of the beneficial and adverse economic impacts associated with the project and its alternatives. The analysis will focus on those factors that are readily quantifiable using available information. This may include an estimate of the potential increase in use of the Alviso Slough due to improved navigation and access (e.g., number of boats that the Slough could support) and related spending patterns by recreation enthusiasts. From a cost perspective, criteria to be used in the analysis are likely to include the estimated construction, mitigation (if any), and future maintenance costs of the project. Other factors that are not readily quantifiable will be discussed qualitatively and integrated into the analysis to provide a comprehensive overview of the economic implications of the project.

This analysis will also consider different strategies for project implementation, and which would best achieve the project goals. For example, the complete removal of vegetation at one time versus a staged removal over several years may be considered in light of the sediment loading and hydraulic dynamics of a modified channel. Strategies will be highlighted where there might be opportunities to potentially mitigate environmental impacts through economic or community development including potential State and Federal grant funding sources as they might be available to disadvantaged communities.

Public Input

Public input will be sought at key times during the project, such as during identification of project alternatives, identification of key issues, and after distribution of the draft environmental reports (CEQA and NEPA documents). Furthermore, the District is committed to working closely with the AWTF throughout this project. The AWTF will be consulted for local data or other input, included in key meetings, and have an opportunity to review or be informed of key findings during the course of the project. The District has also established a permanent liaison between the District and AWTF to facilitate communication and information exchange.

In preparing a permit strategy for this project, the District will contact regulatory agencies for input; this will include informal/pre-application meetings and, eventually the formal permit or consultation process. These agencies will have valuable data and local knowledge relevant to the project. Additionally, other interested parties, such local utilities and Bay Area recreation and environmental organizations, will be able to comment on the project during several public involvement phases required under CEQA and NEPA.

Coordination with South Bay Salt Ponds Project

Many of the objectives of the Alviso Slough Restoration Project coincide with the objectives of the SBSP Restoration Project, including habitat restoration and enhancement, the maintenance of existing levels of flood protection in the South Bay area, and the provision of public access and recreational opportunities. Perhaps most notably, the muted tidal connection at Pond A8 as part of the Salt Ponds Restoration Project could possibly create the conditions conducive to naturally trigger the restoration of the Alviso Slough over the longer term. Discussions with the South Bay Salt Pond Restoration team and AWTF to identify timing and methodology will be required to integrate the two projects successfully.

Permit Strategy Study

The various permitting and resource agencies will be contacted on a preliminary basis to gather information on permit conditions. Given the nature of the project, its location, and the variety of permits required, a presentation at the Corps of Engineer's interagency coordination meeting is the logical first step in crafting a permit strategy. This meeting will involve all pertinent resource agencies and allows the District to solicit pre-application input on the proposed project. Based on the input received at this meeting, a permit strategy will be developed. The permit strategy will be reviewed for project alternative development and selection, and continually revised as new information from the resource agencies becomes available, and / or project conditions change.

Sediment and Water Quality Study

Sediment sampling and analysis of sediment chemistry within Alviso Slough will likely be necessary to support the Section 404 and Section 10 permit processes, analyze the impacts of the proposed alternatives, identify habitat enhancement/self-mitigation opportunities, and develop mitigation measures if necessary. The South Baylands Mercury Project has a component that addresses collection and analysis of sediment samples; sediment samples are to be collected from slough and bank locations and analyzed for constituents of concern. Concentrations of constituents of concern are to be compared to regulatory thresholds and guidelines and the results support impact analysis permit negotiations and ultimately permit conditions and sediment disposal alternatives.

Fisheries Study

No additional fisheries studies are anticipated beyond the current scope for this Planning Study. The District will carefully review existing reports, including reports prepared by the SCVWD and the City of San Jose.

Recreation Study

This study will describe potential recreation opportunities and provide a preliminary basis for potential future projects in the area. The study will include an investigation of recreational uses in the area including boating, fishing, wildlife viewing, walking, and cycling. The study will include on-site data collection supplemented with review of existing data and reports related to the study area, interviews with key community user groups and interests, and interviews with agency personnel responsible for adjacent recreation areas.

The study should include identifying current and planned uses at the County Marina, South Bay Yacht Club, Blue Whale Sailing School, San Francisco Bay Bird Observatory, Don Edwards San Francisco Bay National Wildlife Refuge, Gold St. Education Center, levee trails, local hunting areas, and a planned bridge / trail on the west levee.

The results of this study will provide a representation of how the project area is used now and how the proposed project might enhance future recreation opportunities.

Vegetation/Wetlands and Wildlife Study

No additional vegetation / wetland or wildlife studies are anticipated beyond the current scope for this Planning Study. The consultant team will carefully review existing reports, including reports prepared by the SCVWD and the City of San Jose and other sources.

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APPENDIX A. LIST OF ACRONYMS

AWTF	Alviso Water Task Force
BCDC	Bay Conservation and Development Commission
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CSLC	California State Lands Commission
CWA	Clean Water Act
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act (Federal)
ISP	Interim Stewardship Plan
JARPA	Joint Aquatic Resource Permits Application
MeHg	methyl mercury
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NOAA	National Oceanographic and Atmospheric Administration
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PPM	Parts per million
PPT	Parts per thousand
RWQCB	Regional Water Quality Control Board
SBSP	South Bay Salt Ponds
SCVWD	Santa Clara Valley Water District
SFEI	San Francisco Estuary Institute
SHPO	State Historic Preservation Office
THg	total mercury
TMDL	Total maximum daily load
UPPR	Union Pacific Railroad
USACE	Unites States Army Corps of Engineers
USGS	Unites States Geological Survey
USEPA	United States Environmental Protection Agency
USFWS	United Stated Fish and Wildlife Service
WDR	Waste Discharge Requirement